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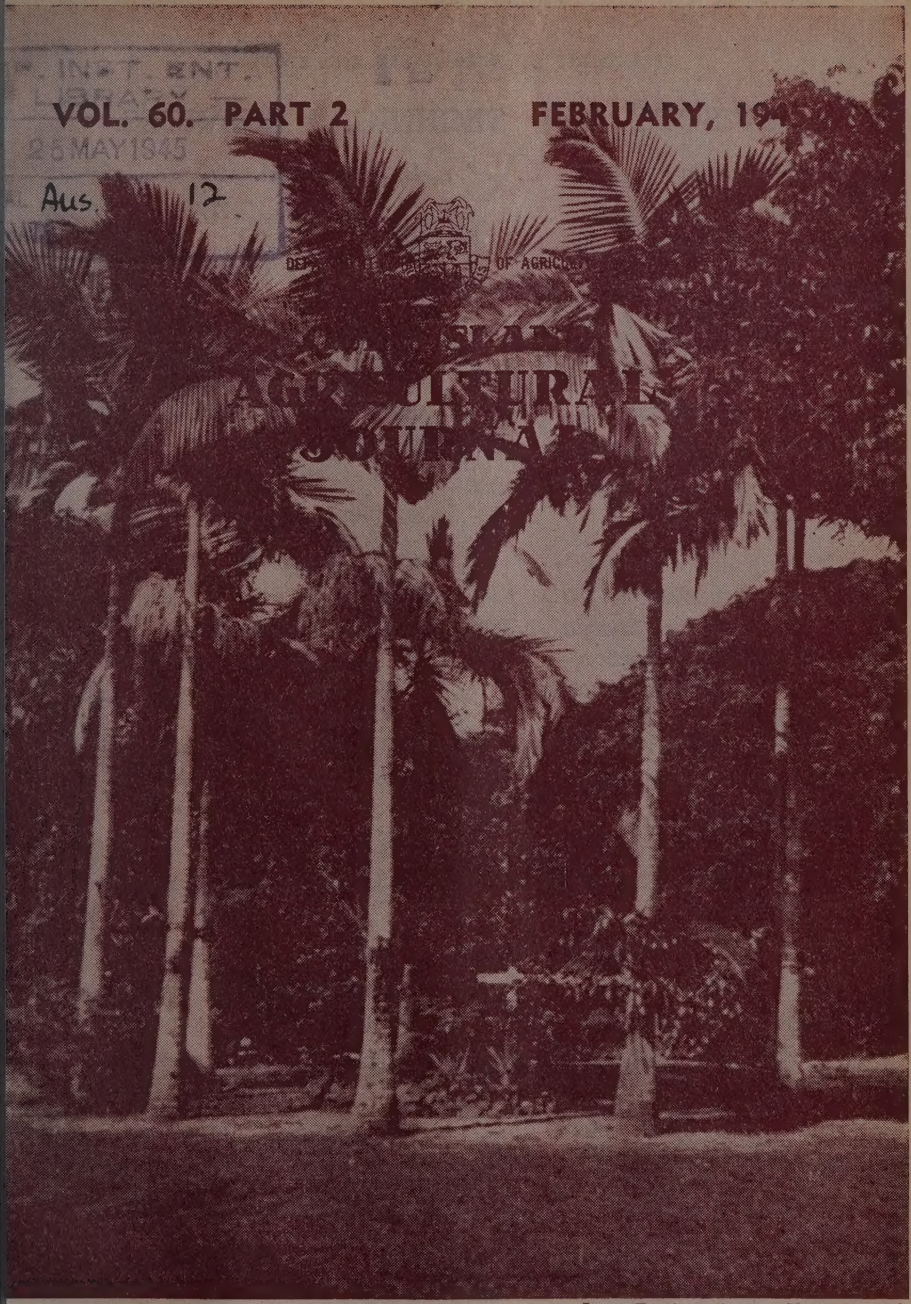

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Early Ploughing for Cotton
Tomato Culture
Chinese Spinach
The Banana Weevil Borer
Damping-off
Milk and Cream Cooling
Trucking Pigs to Factories
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Volume 60 Part 2

QUEENSLAND AGRICULTURAL JOURNAL

Edited by
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Associate Editor
C. W. WINDERS, B.Sc.Agr.

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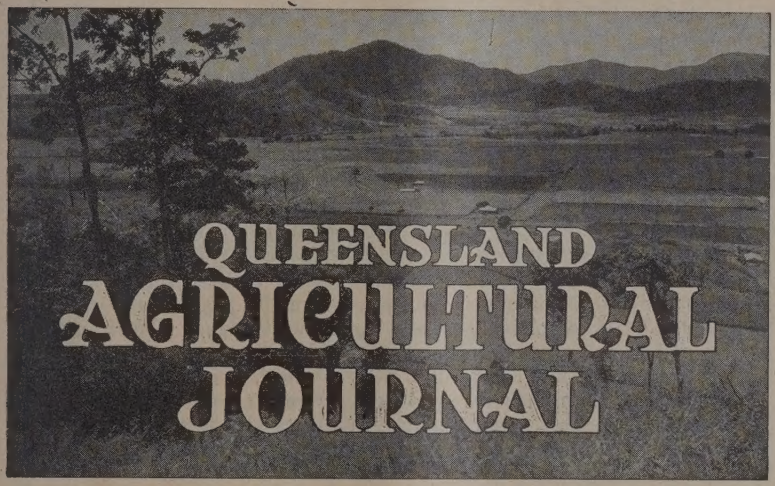


Volume 60 1 FEBRUARY, 1945 Part 2

Event and Comment.

The Farmer, the Stock, and the Pasture.

HIGHEST results from dairy farming are attainable by the successful combination of three factors—the farmer, the stock, and the pasture. On the farmer devolves the management and improvement of his pastures; also sound judgment in selecting his dairy stock and the right methods of feeding them. Plenty of milk in every acre of his grassland is the successful dairy farmer's aim; and good cows are needed to turn the rich pasture into butter-fat. Then, with good pastures and good cows, and cleanliness in every dairy operation, there should be no reason why every can of cream delivered to the butter factory should not be entered as of choice grade.

A farmer may claim that he has good cows, and may produce his factory returns to back up his argument. That evidence, however, may be merely proof that the herd is good, not that each individual cow is good. Until he submits his herd to regular testing, he has not any definite proof that there are not any unprofitable cows in the mob, that the head of his herd is at least maintaining quality in the young stock, or that he is breeding from the right cows. The factory returns are an open book to the farmer who tests his herd regularly, but a sealed book to the farmer working solely on his factory figures.

If the position is to be improved by herd testing, the responsibility is on the farmer to consider the results from each individual cow and, if necessary, apply the remedy. If the farmer does not do this, he cannot put up any case against herd testing. If he does, then the boot will be on the other foot and the value of testing will be proved convincingly in practice.

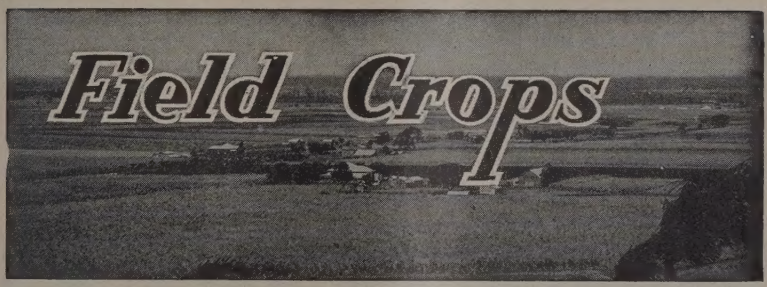
The fertility of the land should, of course, be maintained if the farmer is to get the best out of his pasture. Poor pastures cannot carry cows economically. Each cow returns to the soil a proportion of the plant food it eats in the form of manure, and it has become a maxim of good grass management to break the manure up and spread it with a harrow. Manure-spreading should be regarded as a regular dairy farm routine, and it is a practice which pays handsomely in the long run. The plant foods which are not returned to the pasture are the substances which make the milk and which maintain the bodily needs of the cow.

A point many are inclined to disregard, yet a moment's thought will convince anyone of its soundness, is that a cow which produces, say, 500 lb. of milk in the course of its period of lactation, and which is equivalent to 200 lb. of butter-fat, takes from the pasture at least 7 lb. of lime and 11 lb. of phosphoric acid in the milk alone. These amounts are equivalent to half a hundredweight of bonedust or superphosphate. Thus a herd of 40 such cows would take the equivalent of 1 ton of those fertilizers from the pasture every year. As some of our dairy country is deficient in phosphorus, particularly in places along the coast, such a loss of substance is a very serious matter. That is why the goodness taken out of the pasture should be returned to the soil in some form or other. If essential substances are taken continuously from the soil, the pastures become poor and conditions conducive to stock diseases may develop.

Plant food can be returned to the pastures in various ways. The obvious thing to do is to distribute phosphatic fertilizer over the pasture; a less obvious but efficient method is to give at least 2 oz. of bonemeal to each cow daily. This weight only makes good the calcium and phosphorus removed in the milk.

Good grass is said to be the cheapest and best single stock food. Unfortunately, in seasons of plenty an enormous quantity of grass goes to waste, for practically all grasses after exposure to scorching sun and heavy dews deteriorate rapidly, losing colour, flavour, and quality. There is little difference in the food values of introduced grasses yet they vary considerably in composition according to the season, locality, and age of the crop. As the dairy cow is required to produce a large quantity of milk rich in protein, obviously she should be fed on fodders also rich in protein. The high protein content of grass in its early stages of growth makes it advisable to run stock on it while it is still young.

The growing of improved grasses and the practice of rotational grazing would also assist materially in maintaining the maximum production of the dairy farm. And maximum dairy production is an urgent need at the present time. There are so many more mouths to feed, because of war conditions, that we cannot neglect any means within our power of increasing the production of essential foods. And among the first priority foods are butter and cheese. That is why we require more milk from our grassland and more cream in the can. It is quite plain, then, that our future depends largely on the farmer, his dairy stock, and his pasture.



The Onion.

C. S. CLYDESDALE, Senior Instructor in Agriculture.

GOOD crops of high-grade onions (Plate 27; fig. A) are produced in such widely-separated districts as Kingaroy, the Lockyer, Darling Downs, and Central Queensland. Given the right type of soil similar results should be obtainable in many other regions of the State between or even beyond these limits, where favourable climatic conditions prevail.

Many farmers, unfortunately, view onion growing with an exaggerated idea of the amount of tedious handwork involved in checking weed growth in such a crop. Such handwork can, however, be greatly reduced by careful and thorough preparation of the seed-bed, an important practice that is often neglected.

Climatic Requirements.

Although onions can withstand long periods of fairly dry weather because of their deep-rooting habits, the best results are obtained when reasonably good falls of rain occur during the growth of the crop. Fortunately, in onion-growing districts insufficient rainfall can often be effectively supplemented by irrigation; in fact, if success is desired, irrigation, although not a frequent necessity, is essential some time during the growing period in many parts of the State.

Suitable Soils.

Onion growing has proved successful on a wide range of soil types, but the more suitable soils are undoubtedly the richer, sandy loams and volcanic soils. Sandy soils produce bulbs of good size, but of low-keeping quality, whereas very heavy soils tend to promote the growth of thickened or bull-necked plants of undesirable type (Plate 27; fig. B). The poorer types of sandy soil, however, can be made suitable for onion growing by the addition of well-rotted farmyard manure, applied preferably for a previous crop, and by the application of fertilizers.

Preparation of the Soil.

To ensure good germination the seed-bed surface should be fine and loose, but the sub-surface should be firm and moist, for looseness in the sub-surface promotes the production of undesirable bull-necked plants, and is conducive to dryness. To obtain favourable seed-bed conditions the land should be ploughed as early in the year as is possible, the

ploughing being followed by repeated harrowings to kill weed growth and to reduce the surface to a fine tilth. Where the soil is loose and of light texture it should be rolled occasionally to consolidate it below the surface and deep cultivation after the original ploughing should be avoided.

Planting.

The seed may be sown either in drills in the field or broadcast in small seed-beds, whence the seedlings can be transplanted to the field. When sowing takes place in the field the drills should be 12 to 15 inches

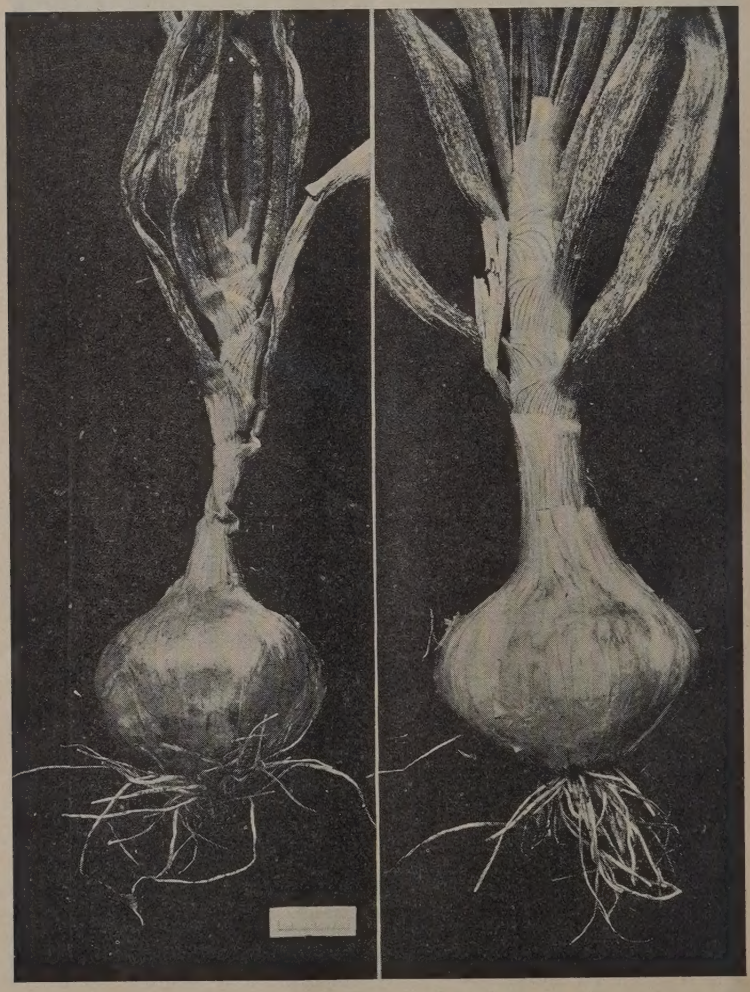


Plate 27.

A. DESIRABLE TYPE OF ONION. B. UNDESIRABLE BULL-NECKED ONION.

apart and the seed sown at a depth of ½ to 1 inch at a rate of 3 lb. per acre. For this purpose a hand-sowing machine is the most convenient implement to use. Owing to the rapid deterioration of onion seed only freshly grown seed should be used. Experience has shown that it pays to buy seed from a reliable source at slightly higher rates, rather than to rely on cheaper seed from an unknown source.

When the young plants are 4 or 5 inches high they should be thinned so that a distance of 4 to 6 inches separates neighbouring plants, and this is best accomplished by using a 2-inch-wide hoe made by cutting down the usual chipping hoe to that dimension. When onions are grown on irrigated areas, however, the spacing of the plants should be closer, the distance between neighbouring plants, after thinning, being 3 to 4 inches.

Plate 28.

A CROP OF BROWN SPANISH ONIONS GROWN UNDER IRRIGATION.

The growing of seedlings in seed-beds and their subsequent transfer to the field has the advantage that it allows an additional five or six weeks for the preparation of the land and may result in a more even stand of plants. It entails, however, the additional labour of transplanting, and the plants invariably incur a setback when they are moved to the field. In some districts, therefore, it is not practised owing to the likelihood of unfavourable weather occurring when the time arrives for the operation of transplanting. The best time for transplanting is when the plants are 4 or 5 inches high. Both the root and leaf should be pruned back when they are being moved.

The most suitable time for planting onions varies from late March in the southern districts to late May or even early June in the Central district, and may even extend to the month of July. Planting too early

causes losses due to flowering, and late plantings result in the bulbs having insufficient time to mature properly and, consequently, they are small and frequently become scalded or boiled by the hot and moist conditions usually prevalent in summer. Late-maturing varieties should be planted early, and early-maturing ones late.

Cultivation of the Crop.

Cultivation between the drills, subsequent to planting, is best accomplished by means of a wheel hoe fitted with suitable weeders, care being taken to draw the soil away from, rather than towards, the plants. The cultivation operations should be sufficiently frequent to keep weed growth in check; provided the seed-bed has been prepared early in the season and kept clean, little hand-weeding between the plants should be necessary.

Harvesting.

A period of five to seven months will elapse from the time of planting to the date at which the onion crop reaches maturity—an event which is indicated by the shrivelling of the stalk immediately above the bulb, the stalk subsequently falling over, yellowing, and dying. The exact time that will elapse between the planting of the crop and the date of maturity will, of course, depend in large measure upon the time of sowing, on the variety chosen for planting, and on the locality in which the crop is grown. Harvesting should commence at the yellowing stage, the plants being pulled and laid in windrows. Three or four rows constitute a windrow, and the plants are placed in such a way that the leaves of one overlap and shelter the bulbs of those placed in the windrow immediately before it. When the weather is very hot, however, there is a risk of scalding, especially of the lower portion of the bulb, and to obviate such an occurrence the root may be cut immediately below the bulb with a sharpened spade or other hand-operated or horse-drawn implement, the bulbs being left resting in their normal growing position until wilted. After two or three days, they should be dry enough for carting to the shed, which must protect them completely from rain and dew, and provide good ventilation. The bulbs are then placed on racks in thin layers to complete drying. When dried sufficiently, the leaves should be removed by either screwing them off or by cutting, and the bulbs are then graded and packed for marketing.

Grading and Marketing.

Better prices are generally received when the bulbs are graded into sizes according to popular demand, always remembering that moderate-sized onions are in greater demand than those of larger size. A suggested basis for grading is as follows:—

Grade 1.—Onions 2½ inches to 3 inches in diameter.

Grade 2.—Onions 2 inches to 2½ inches in diameter.

Grade 3.—Onions over 3 inches in diameter.

Grade 4.—Onions under 2 inches in diameter.

Onions are usually marketed in open-mesh sacks, but crates are to be preferred for marketing, particularly when the markets are situated at a considerable distance from the centres of production. A crate usually referred to as the Japanese, and measuring 15½ inches by 15½ inches by 22⅝ inches, is sometimes utilised in interstate trade.

Seed Production.

Good-quality, true-to-type, firm, thin-necked bulbs only should be selected for the growing of onion seed, the bulbs being planted during the month of June, thus allowing several months to elapse between the harvesting of the bulbs and their replanting for seed production. They should be placed to half their depth in the soil, the top of each bulb being covered lightly; if the crown is split prior to planting out, the emergence of the seed stalk will be facilitated. The bulbs should be planted in rows about 3 feet apart, with about 15 to 20 inches between the bulbs. When ripe, the seed heads are hand-gathered, and when thoroughly dry are usually hand-threshed and winnowed.

Varieties.

The late-maturing Brown Spanish is the standard main crop variety; it is of good appearance and flavour, is firm, and keeps well, but it is generally too slow in maturing to suit the more tropical portions of the State. Hunter River Early White is an early-maturing variety. It is globe-shaped, is of good appearance, has a mild flavour, and is a good, heavy yielder. It is an excellent variety for the early market. The next variety worthy of mention is Extra Early Flat White. It is an early-maturing, white variety, is flat-shaped, and of good appearance. It has a mild, good flavour, and gives good yields. Extra Early Golden Globe is an early variety of good appearance, but it gives rather inconsistent results. It is firm, has a good flavour, and keeps fairly well. A very early variety is Early Hunter River Brown Spanish, which is particularly suited to the warmer districts. It has a good shape and flavour and keeps fairly well. Early Barletta is an early, small, white variety which is used for pickling, and when intended for such purposes it is planted closely. It does not keep well, but it has a good flavour. A fairly late-maturing variety is White Imperial. It has a good flavour and shape, it keeps fairly well, and is reputed to be an excellent seller. Mammoth Silver King is early-maturing, but it is very inclined to split, and does not keep at all well. The Odourless variety is late-maturing. It has an excellent mild flavour and keeps fairly well.

Shallots, Garlic, and Potato Onions.

Shallots (or eschalots), garlic, and potato onions, used as flavourings for salads and sauces, are propagated by bulbs, planted in rows 4 to 6 inches apart. These bulbs produce crops by multiplying into a group of young bulbs which may be used immediately on harvesting or stored. They, however, have a limited market and are grown usually in small areas for the supply of local requirements.

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Early Ploughing for Cotton.

W. G. WELLS, Director of Cotton Culture.

THE yields of cotton which have been obtained in both investigations and commercial plantings in the districts south of Mackay have amply demonstrated the advisability of planting cotton in these areas only on land that has not been cropped more than three seasons following the breaking up of old grassland. In some instances, however, growers have failed to obtain satisfactory returns from crops planted on newly broken up grassland, especially old Rhodes grass pastures. An examination of the causes of low yields when good cultivation has been maintained, has usually indicated either that the crops were late planted, or that they received insufficient rainfall to enable an early planted, heavily-laden crop to develop satisfactorily under stress conditions in December and January. In either case, in most seasons, had the land been ploughed early enough to conserve some of the late summer rainfall and to trap the autumn, winter and early spring rains, there would generally have been sufficient subsoil moisture to increase markedly the prospects of obtaining satisfactory yields.

The value of early ploughing for the cotton crop is not appreciated sufficiently by most cotton growers in these districts. Generally speaking, after June the rainfall is most irregular and uncertain until storms introduce the summer rains, yet many farmers do not plough their land for cotton until July or August, when the surface soil is often dry and hard. Good ploughing is impossible under these conditions and in addition the subsoil is generally dried out to a depth of at least 2 feet through the demands of the previous crop.

Late autumn or winter ploughed land usually requires a penetrating planting rain that will consolidate the seed bed and provide the moisture needed to obtain a satisfactory stand of cotton seedlings and to maintain them during the prolonged hot dry weather which is frequently experienced in the late spring or early summer. Unfortunately the rains often received at the start of the regular planting period do not penetrate beyond the depth of the ploughed soil. As the cotton stand obtained early in October in the Central District and in the second half of that month in the southern districts largely controls the chances of producing a good crop, most farmers plant them following the occurrence of a good germinating rain, hoping that further rain will occur in time to establish the resultant seedlings. If sufficient rain does not eventuate within the required period, then the crops may be

completely lost or a thin stand survives which cannot exploit the full producing potentialities of the soil. In some seasons it may not be possible to replant until too late to produce a profitable crop. It is obviously very important, therefore, to have ample supplies of subsoil moisture available at the start of the regular planting period to ensure the maintenance of the first stand obtainable.

Late summer ploughing is also advantageous in that there is usually less weed and grass growth in the following cotton cultivation than is the case where cotton is planted on an area ploughed in the winter, especially if very dry conditions prevail during the winter and spring. In one demonstration conducted in the Upper Burnett, in a virgin pasture on a forest slope, mid-March ploughing was compared with May ploughing in a very dry autumn. Owing to lack of rain, planting was delayed until the 23rd of November. Although dry conditions broken by light storms prevailed for the rest of the season, it was not possible to maintain clean cultivation in the later ploughed area with three cultivations with a disc cultivator, whereas at the end of the season the earlier ploughed area, which received only this number of cultivations, was more or less free of weed and grass growth. In addition a yield of 600 lb. seed cotton per acre was obtained as compared with approximately 400 lb. on the later ploughed area.

Numerous other illustrations have been obtained in demonstrations and in commercial plantings, of the advantages gained from ploughing land in late summer for a crop of cotton rather than in the autumn or winter. During the 1943-44 season at the Biloela Research Station the crop grown on a forest alluvial loam ploughed in March after three years Rhodes grass appreciably outyielded crops grown on June and later ploughed areas of both Rhodes grass land and old cultivations. Soil moisture determinations indicated that at planting time early in October, the March ploughed areas were wet to 34 inches as compared with 22 inches in the June ploughing and only 17 inches in the August ploughed old cotton cultivations. As an inch of steady rain will penetrate only approximately 6 inches in dry firm soil of the clay loam soils on which most of the cotton of this State is grown, it would require at least 6 inches of penetrating rain within a week to wet August ploughed land to the depth that was attained through the March ploughing.

The value of ploughing soon after the February rains was demonstrated by the average yields obtained from September and October plantings on March and June ploughed land. Crops on the March ploughings averaged 971 lb. seed cotton per acre compared to 908 lb. in those grown on June ploughed areas. The highest average yield produced was from the September planted March ploughed areas—1,131 lb. seed cotton per acre—which exceeded September planted June ploughed areas by 189 lb. seed cotton per acre. Later ploughed three-year old Rhodes grass and old cultivations failed to produce over 500 lb. seed cotton per acre.

The season was characterised by good growing conditions during December, followed by five weeks of intensely dry hot weather when all squares and small bolls were shed. At the start of the stress conditions the mid-September planting on the March ploughed area had the most well developed bolls and the sub-soil moisture made available by the early ploughing allowed the crop to mature a greater number than any other combination of time of ploughing and planting.

Recent investigations indicate that grassland should be ploughed soon after soaking rains in February have wet the soil to a depth of 3 or more feet. Although 6·5 inches of rain between the 17th and 20th February, 1944, wet three-year old grassland to a depth of at least 36 inches, the Rhodes grass exhausted nearly all of the moisture to a depth of roughly 24 inches by the time ploughing was carried out on the 4th April. In the absence of worth-while rains between February and June the Rhodes grass in another series of plots had practically exhausted the moisture to a depth of 36 inches when the land was ploughed in June. Above normal rainfall in July (2·15 inches) wet the surface soils of both April and June ploughings only to a depth of approximately 12 inches. Under such dry late summer and autumn conditions the normal rainfall during the spring and early summer months is insufficient to make up the deficiency of subsoil moisture brought about by delaying ploughing for only six weeks after good rains in February.

It has been found at the Research Station that where isolated one-inch thunderstorms of the torrential type occur at mid-season after the ploughed soil has firmed, an average penetration of not over 4 inches may be obtained in flat alluvial, dry clay loams. Consequently it is only when very prolonged wet condtions are experienced that any marked penetration of rain to the lower subsoils occurs during mid-season. Soil moisture determinations have also shown that in many seasons the cotton crops grown on late July and August ploughed old cultivations at the Research Station have been produced with the moisture contained in the upper 2 feet of soil. As an early planted cotton crop will at mid-season practically exhaust the moisture from the upper foot of soil within a fortnight, such crops have been dependent on the regular occurrence of timely soaking rains to maintain a steady development of the plants and their fruiting systems. Where the rains have been delayed much past this period, checking of plant growth with a consequent shedding of flower buds and small bolls has resulted.

It can be realised, therefore, how cotton crops planted early on late ploughed areas are dependent on the occurrence of either frequent penetrating rains during January and February or good penetrating rainfall in October, early November and late December to provide sufficient subsoil moisture to enable the plants to withstand stress conditions in a dry January or February.

It is realised, of course, that under favourable conditions cotton crops grown on land ploughed even as late as the end of August may produce satisfactory returns. Such results have occurred, however, mostly when the plantings have been made after good rains prior to mid-November, and exceptionally good rains have fallen in December, followed by dryish conditions during January and good rainfall in February. The plants had thus enough moisture to promote a steady slow growth until the December rainfall provided ample subsoil moisture. The dryish conditions in January prevented rank growth occurring as a result of the December rainfall, and then the February rains were sufficient to continue the development and maturation of the crop. Unfortunately such ideal conditions do not occur each season for, as a rule, a stress period is experienced some time in the growth of the crops and in the absence of adequate subsoil moisture, the plants react severely.

It is urged, therefore, that growers make every effort to plough for cotton during late February or early March and if possible use old grassland. If this is not available, then, where a small acreage of cotton is to be planted, land that has been under either Sudan grass or giant setaria (giant panicum) may be used. Under no circumstances should cotton be planted following either Japanese millet or white panicum owing to the extra cultivation costs incurred as a result of the volunteer seedling growths from these crops. Where a large area is to be planted and the required acreage of grassland for early ploughing cannot be obtained, as much grassland should be ploughed as possible and the remainder of the intended area made up from land that is in the second year of cotton following grassland or failing that, land that has been in Sudan grass or giant setaria. In this way early ploughing of all but the cotton land can be done. By removing the old plants as fast as the crop is harvested and following quickly with the ploughing, it may be possible to plough the cotton land in time to conserve much of any late autumn and winter rainfall experienced. The second year cotton land generally should also be sufficiently permeable to trap efficiently most of the summer rainfall, especially prior to the cessation of the cultivation operations.

It is strongly stressed, however, that cotton should not follow cotton if the land has been three years or more out of grassland, unless irrigation facilities are available. It is this practice that is largely responsible for the poor yields obtained by a large number of farmers each season.

It is also urged that, where land has been ploughed early and a wet autumn or early winter has made it necessary to cross plough, only a light skim cross ploughing be done in order that the least possible drying out of the subsoil will be caused. Deep cross ploughing dries out not only the loose surface soil but also the upper subsoil. Consequently very good planting rains will be required to obtain a satisfactory germination and to maintain the resultant seedlings until they are thoroughly established.

From the results which have been obtained in demonstrations and commercial plantings, early ploughing can be expected to increase appreciably the average yield of cotton per acre in most seasons and should therefore be practised by all cotton growers.

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Soils, Fertilizers, and Manures.
Farm Bookkeeping.

Enquiries for advisory literature on other subjects would be welcomed.

Because of paper restrictions, inquirers are requested to apply only for the publications they actually need.

All applications for departmental publications should be addressed to **The Under Secretary, Department of Agriculture and Stock, Brisbane.**

Tomato Culture in Queensland.

C. N. MORGAN, Fruit Branch.

THE tomato plant is recorded as a native of tropical America, known to the native Indians as "Tomati," and is said to have been one of the food plants of the Incas of Peru in very early times. It was introduced to Europe in the 16th century, being first grown in the coastal areas of Spain and Portugal; later, it spread to Italy and thence to Holland, where it was grown as a curiosity. About 1596, the cherry tomato or "love apple" or "amorous apple," as it was variously known, was introduced to England, where it became widely grown as an ornamental plant, but was rarely eaten.

The types of tomato introduced into Europe by Spanish adventurers have been described by herbalists of the time as "flat and round like apples and divided into segments like melons," and "good apples, chamfered, uneven, and bunched out in many places; of a bright shining red colour and the size of a goose egg." These early varieties were, of course, very different to those now cultivated so widely and which have been evolved as a result of crossing the cherry tomato with larger wrinkled types, and then selecting for shape, smoothness of skin, solidity and resistance to disease.

By the 18th century more was known of the edible qualities of the tomato, and in Italy, and probably in other European countries, it was grown as a field crop. During the 19th century, it was reintroduced to America, where for a number of years it was subjected to trials.

In tomato culture, probably, greatest progress has been recorded since 1915, when the United States Bureau of Plant Industry commenced tomato breeding work under the supervision of F. J. Pritchard, who did notable work in breeding improved disease-resistant varieties of tomatoes and developed some of the popular varieties now grown in Queensland. In 1925, for instance, he produced "Marglobe" and later "Break-o'-Day" and "Prichard," which was named after him. Another popular variety in U.S.A., know as "Glovel," of the same parentage as Marglobe (Globe x Marvel), also was bred by Pritchard, and in the United States is regarded by some as even superior to Marglobe.

Value of the Industry

The accompanying table compiled from statistical returns shows area, average yield and gross value of the industry in Queensland over a period of years, and also shows the approximate average production and value on the acreage basis:—

TABLE 1.

Year.	Area in Acres.	Yield in Bushels.	Gross Value.	Approx. Average Production per Acre in Bushels.	Approx. Average Gross Value per Acre.
			£		£
1936	5,131	476,251	213,125	93	41
1937	5,275	500,486	198,005	95	38
1938	4,944	492,020	227,035	99	46
1939	5,677	570,986	276,433	100	49
1940	5,511	587,757	285,174	106	53
1942	6,365	609,666	637,402	96	100

It will be noted that the State average of production is fairly static, at around 100 bushels per acre; and also that in pre-war years the average annual gross value per acre did not fluctuate widely. The average of the gross value for the five years 1936-40 is £45 per acre, and for the first four years of this period the return in any year was not more than £4 either above or below the average. The effect of the increased demand and consequent higher price because of the war is reflected in the figures for the year 1942, when the acreage increased about 20 per cent. above the average for the other five years shown, while the value increased over 100 per cent.

Although tomatoes are grown in practically all parts of Queensland, three main producing districts are recognised and from them is derived 80 per cent. of the aggregate production, viz:—

(*a*) *Metropolitan*, embracing the area within a radius of 25 miles of Brisbane, and marketing more or less all the year round;

(*b*) *Stanthorpe Tablelands*, with an average height of 2,500 feet, marketing in the late summer and autumn from January to April;

(*c*) *Bowen*, North Queensland, marketing in the winter and early spring from June to September.

It is useful to compare the production per acre from each of the three districts, and in the subjoined table the average of three years—1938 to 1940—is shown for each district.

TABLE 2.

District.	Average of District Acreage for Three Years.	Average of Total District Production for Three Years.	Average Production per Acre over Three Years.
		Bushels.	Bushels.
Metropolitan	1,144	176,863	154·5
Stanthorpe	1,874	167,500	90
Bowen	1,410	136,100	96·5

In the Metropolitan district the average production per acre is about 60 per cent. greater than that of the other two districts, mainly because a proportion of the production is from trellised crops and nearly all areas are irrigated. At Stanthorpe and Bowen, wide planting and ground cropping are general practices. Most Bowen growers irrigate, but very few do so at Stanthorpe.

Varieties.

The selection of varieties to suit local conditions and the season of the year when it is intended to produce are important. A particular variety may be very suitable, say, as a winter cropper, but be almost a total failure during summer. Also, a variety which is successful in the Stanthorpe district is not necessarily so at Bowen.

There are some very good varieties grown in Queensland. Most of them have been selected for the desirable characteristics of disease resistance, quality, type and regular cropping. Following is a list of popular and widely grown varieties—all smooth-skinned types with the exception of Rouge-de-Marmande which is somewhat ribbed.

Southern Coastal Queensland.—

For spring planting.—Break-o'-Day, Marvana, Australian Earliana, Marglobe, Red Marhio.

For autumn planting.—Break-o'-Day, Pearson, Rutgers, Pritchard, Red Marhio, Marvana.

For winter planting.—Salads Special, Walker's Recruit, and Rouge-de-Marmande.

Stanthorpe district.—

For spring planting.—Rutgers, Pearson, Break-o'-Day, Marglobe.

Bowen district.—

Autumn planting.—Bowen Buckeye-Globe.

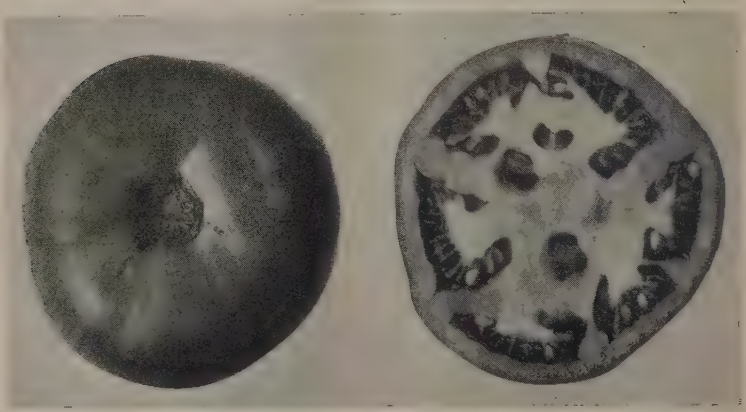


Plate 29.
THE BREAK O'DAY TOMATO.

Following is a brief description of the varieties named:—

Break-o'-Day.—A cross between Marglobe and Marvana, probably the most popular variety grown in Southern Queensland; particularly good as an autumn tomato, but also very suitable under normal spring conditions: can be grown as a bush or trellised and pruned; highly wilt-resistant; plant has a sprawling habit of growth when grown as a ground crop and, being sparsely foliaged, the fruit is liable to sun scald if grown well into the summer; fruit is large and does not mature quite as early in the spring as Marvana or Australian Earliana; may be described as "second early."

Marvana.—A cross between Marvel and Earliana; a popular "first early" variety for spring cropping; highly wilt-resistant; growth fairly open, though not so much as Break-o'-Day; fruit of small to medium size is borne in clusters and is bright red when ripe.

Australian Earliana.—Another popular "first early" spring variety similar in almost every detail to Marvana. A heavy cropper. Of the two, Marvana is the more popular.

Marglobe (Marvel x Globe).—Is not as early as Marvana or Australian Earliana, and although slightly later than Break-o'-Day, may be similarly termed a "second early" variety. The habit of growth tends to be dense and upright, shading the fruit, and making it suitable for early summer growth. It is highly wilt-resistant. The fruit is medium to large and uniformly dark red when mature. The tendency is for the bottom two hands to produce large fruits and for subsequent fruit to be smaller.

Pearson.—A comparatively new variety named after Dr. Pearson who bred it. Although not yet grown to the same extent as some of the other varieties, it shows great promise as an autumn tomato. It is a self pruning variety, with a compact growth, and is suitable only as a ground crop. When grown as an autumn crop, it is not troubled by wilt. The fruit is medium to large and brightly coloured when mature. It is an excellent carrier.

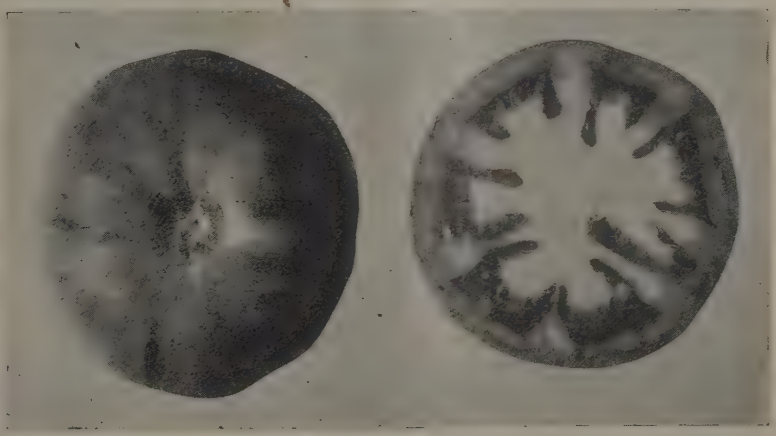


Plate 30.
The Pearson Tomato.

Rutgers.—This variety is becoming more popular around Brisbane as an autumn ground crop, and also in the Stanthorpe district. It is comparatively new and has spreading upright type of growth. The fruit is medium large and highly coloured, and is uniformly sized throughout the crop.

Pritchard.—This is a good autumn variety which is grown as a ground crop. It has a compact type of growth and shows wilt resistance. The fruit is medium large and bright scarlet when mature.

Red Marhio.—This variety is grown both as a "second early" spring and as an autumn crop. It is sometimes known as Red Break-o'-Day which it resembles, although its habit of growth is not so straggling. It is a very good carrier and a heavy cropper. The fruit is medium to large and more highly coloured than Break-o'-Day.

Salads Special.—This variety was introduced from New Zealand and reselected for several years in New South Wales. It is a cluster type and is a consistent and heavy cropper of good medium size fruits which are uniform and well shaped. It is best grown on trellises or stakes and pruned. When grown as a ground crop much of the fruit is of small size. It has a slight natural resistance to wilt and its scanty foliage makes it particularly suitable as a winter crop. It is an excellent carrier and very highly coloured when mature.

Plate 31.
SALADS SPECIAL TOMATO.

Walker's Recruit.—Not so extensively produced as Salads Special, but its habits of growth are very similar. It is a cluster type not generally suitable for growth as a ground crop. It is a heavy bearer of small to medium size fruits which are bright red in colour when mature. It has some degree of resistance to fusarium wilt.

Rouge-de-Marmande.—A strong growing variety and exceptionally early. The fruit is medium large, well coloured and is rather wrinkled in appearance. It has proved a good variety to grow on the ground during the colder months of the year in frost free areas, setting its fruit when the American types, such as "Break-o'-Day," are not satisfactory.

APPLIED BOTANY

Chinese Spinach.* A Useful Summer Vegetable.

C. T. WHITE.

AT odd times there have appeared in Brisbane fruit and vegetable shops young plants tied in bunches and sold as English spinach. It was clear that these were not English spinach, which is hard to grow in coastal Queensland, at least near sea level, and had obviously

Plate 32.
Chinese Spinach.

been grown near Brisbane. Beds of this vegetable have been seen in a Chinese market garden and have proved to be Chinese spinach, an ally of the plant known in Queensland as Leichhardt cabbage.†

* *Amaranthus gangeticus.* † *Amaranthus viridis.*

Many plants of the Amaranth family make excellent greens, including the garden Celosias which include the Cockscomb and Prince's Feather. I have grown Chinese spinach in my own garden for some years and nothing revels more in hot weather when other leafy vegetables languish. From personal experience it is much superior to silver beet. The plants may be pulled or cut when about 6 inches high or may be left until a foot to 2 feet high, and may be cut continuously over a period of, say, two months. In older plants, the stalks, including the leaf-stalks, should of course be rejected. The leaves should not be overcooked, ten minutes suffice.

Seed should be sown any time from September to January. The seedlings transplant easily, but the best plan is to sow them in drills a couple of feet apart and thin out.

ANSWERS.

(Selections from the outward mail of the Government Botanist.)

Black Pigweed.

L.B. (Miriam Vale, N.C.L.)—

Your specimen is Black Pigweed (*Trianthema portulacastrum*). In some agricultural districts this plant becomes a serious pest in cultivation, but is not known to spread very much into ordinary pasture. It is eaten by stock, but not greedily. It is probably liked better when it is drying off somewhat, as in the case of some other succulent plants. It is not known to possess any poisonous or harmful properties at any stage of its growth.

Stagger Weed. Dead Nettle. Shepherd's Purse.

P.N.M. (Ashgrove); J.H.H. (Chinchilla); R.A.T. (Stanthorpe)—

1. Stagger Weed (*Stachys arvensis*), also called Wild Mint or Mint Weed, but not to be confused with the very bad pest on parts of the Darling Downs, also called Mint Weed.
2. Hen Bit or Dead Nettle (*Lamium amplexicaule*).

These plants are very closely allied and both have been proved by feeding tests to cause staggers or shivers in working stock. Ordinary paddock or resting stock, such as dairy cows, feed on them with impunity and many regard them as quite good fodders in stubble. Animals have to be driven or excited in some way before trouble occurs. It is thought quite safe to feed them to poultry.

3. Shepherd's Purse (*Capsella Bursa-pastoris*). A very common weed of cultivation and in grassland in southern Queensland, and is generally regarded as quite a good fodder, although it is apt to give rather a turnip or mustard flavour sometimes to milk and cream.

Bitter Bark or Native Quinine. Daisy Bush.

E.M. (Texas, Q.)—

1. Bitter Bark or Native Quinine (*Alstonia constricta*). This plant is sometimes called Wild Peach or Poison Peach, but the name more correctly belongs to a totally different plant, *Trema aspera*. Both, however, have been proved by feeding tests to be poisonous to stock. The Native Quinine or Alstonia is a very common tree in Queensland and sometimes comes up thickly on ploughed land. There is a moderate demand for the bark as a general bitter, though probably not at the present time. Although poisonous to stock, losses from it are rare in Queensland.
2. A plant also incorrectly known as Peach Bush, but in no way related to the true Poison Peach. It is *Olearia elliptica*, a species of Daisy Bush. It is not poisonous or harmful in any way so far as is known.

PLANT PROTECTION

The Banana Weevil Borer.

J. A. WEDDELL, Research Officer.

THE banana weevil borer* is an important pest of banana plantations in Queensland. Nevertheless, it is seldom seen and, if no control measures are applied, the pest may not be noticed until the damage has already been done and the work of the insect is obvious. Consequently, growers should understand the life history and habits of the insect, in order that they may recognize the injury to the plant and apply the appropriate measures for its control.

Life History and Habits.

The adult stage of this insect is a weevil (Plate 33; fig. 4). which is hard-shelled, black in colour, about half an inch in length, and which has a long proboscis or snout. It shelters by day in moist trash, cut stems lying on the ground, damaged corms and similar material in the plantation, and is rarely seen moving about in the open. When disturbed or exposed, it shams death for a period and then moves to shelter. The weevil may live for more than a year and there are indications that eggs are laid by it over a greater part of this period. The adult feeds on both stem and corm tissue, but the amount of damage caused is of little consequence compared with that due to the grub.

The egg (Plate 33; fig. 1) is white, sausage-shaped and about one-twelfth of an inch in length. When laying, the female first eats a small hole into the corm or a fallen or cut stem and then lays an egg into the hole. The sap congeals over the egg which is thus difficult to detect by surface examination. The egg hatches in about eight days in warm weather—with a minimum of four days in the height of summer—but more than four weeks may elapse before the completion of this stage in winter. The peaks of egg-laying occur in spring and autumn, but eggs are also laid at other times of the year.

The very small larva or grub that emerges from the egg immediately commences to tunnel into the tissue of the plant, and the larval burrow extends into and through the corm or cut stem, the burrow behind the grub being packed with dark-coloured debris. The grub (Plate 33; fig. 2) is normally full-grown in about six weeks in spring weather though it takes much longer in winter and a shorter period in summer to complete its development, the minimum recorded being about two weeks. The stout, soft-bodied, legless grub then is about half an inch long and is creamy-white in colour, with a brown head. It is responsible for the greater part of the damage to the plant (Plate 34). The grub usually completes its feeding near the surface of the corm and

* *Cosmopolites sordidus* Chev.

then pupates (Plate 33, fig. 3) within the larval burrow. After about seven days in this life cycle stage the adult emerges from the pupa; at first, it is a pale-brown, inactive weevil and some days elapse before it becomes black and hard and moves about freely.

While an individual weevil may live for over a year, the immature stages may, under favourable conditions, be completed in less than six weeks. It is therefore easy to understand how a large population can be built up quickly in a plantation in which measures for the control of the banana weevil borer are not applied. Although the adult weevils have wings, they seldom fly, and attacks in new plantations are brought about principally by the introduction of infested planting material.

Plate 33.

BANANA WEEVIL BORER: Fig. 1.—Eggs; Fig. 2.—Larva or grub; Fig. 3.—Pupa; Fig. 4.—Adult. All figures × 4.

[*Drawings by I. W. Helmsing.*

Nature and Importance of the Injury.

The young suckers in a plantation may be killed by the larvae feeding on the stem or at the growing point. Thus, a very patchy stand may result when infested suckers are planted. Once the plantation is established, the older plants composing it can withstand a fairly high banana weevil borer population during favourable weather conditions without any obvious ill-effects. However, plants with heavily infested

corms react very quickly to dry weather because their reserves of food material are low and many of the root bases have been destroyed by the weevil infestation. Again, during windy or protracted wet weather, infested plants tend to fall over. Unfortunately, the plants most liable to collapse are those carrying maturing bunches. Weevil infestation also results in a shortening of the productive life of a plantation and in lower total returns.

Thus, this pest may affect a banana plantation in three ways. It may:—

(1) Ruin the stand shortly after planting;

(2) Weaken the plants so that they cannot survive adverse conditions, even though they may appear normal;

(3) Shorten the productive life of a plantation.

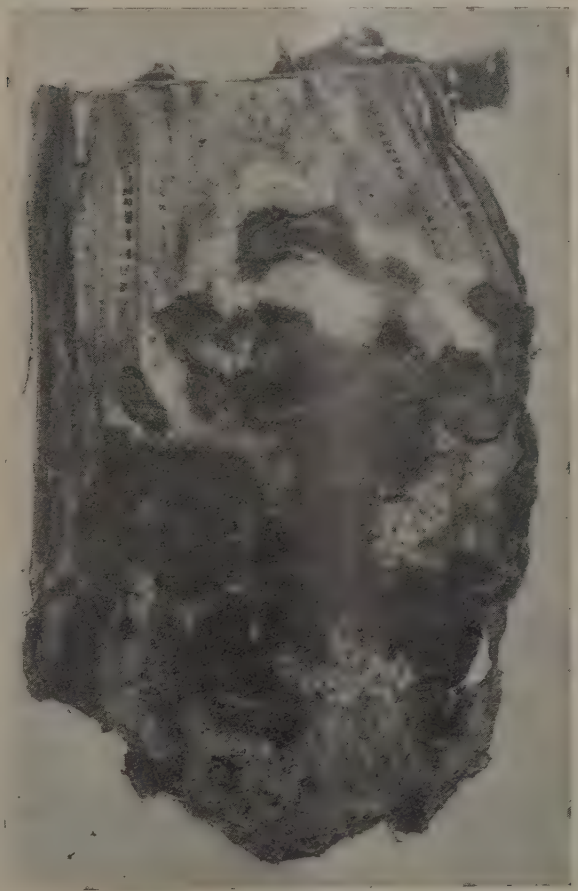


Plate 34.

Butt of Banana Sucker, About 3 Months Old, Showing Severe Damage by Grubs of the Banana Weevil Borer.

Control Measures.

Measures for controlling the banana weevil borer logically fall into two categories:—(*a*) the use of planting material which is free from the pest, and (*b*) the control of the insect in established plantations.

To ensure clean planting material, the following points should be observed:—

(1) The transfer or purchase of banana-planting material is controlled by the Banana Industry Protection Board, and the intending grower should make himself acquainted with the requirements of the Board by enquiry from its local agent.

(2) The plantation from which the suckers are to be drawn should be free, or nearly so, from banana weevil borer infestation. Control measures should have been consistently carried out in the area.

(3) All of the suckers should be examined when they are dug and the outer layer of corm should be pared to a depth of at least one-eighth of an inch; this will have no adverse effect on the subsequent growth of the plant. Any eggs that may have recently been laid are removed with the parings. If grub burrows are exposed, then further slight paring may remove all signs of the damage; if, however, deep gouging is necessary, the suckers so affected should be rejected.

(4) The pared suckers should be bagged immediately and must be removed from the area before nightfall; otherwise, egg-laying adults may be attracted to the freshly-cut surfaces of these young plants. Alternatively, the suckers may be pared near the planting site. In this case the soil must first be removed from the suckers, which are then examined to ensure that adult weevils are not carried from the old to the new plantation along with the suckers.

(5) All parings and discarded suckers should be destroyed, preferably by burning; alternatively, the rejected material may be chopped up and spread thinly to dry in the sun.

The maintenance of control of the insect in an established plantation involves the adoption of certain simple modifications of, and additions to, the regular programme of work. The most satisfactory poison for use in banana weevil borer control is Paris green which is mixed thoroughly with flour at the rate of 1 lb. of Paris green to 6 lb. of flour. This mixture should be stored in a tin with a tight-fitting lid and, for its application, a "pepper-pot" should be made by perforating small holes in the lid of a ½-lb. cocoa or similar tin. A wire hook fastened to the tin so that it may be carried on the belt is a convenience.

When desuckering the plantation, that is, removing the unwanted suckers, the cut surface of the corm should be dusted with the poison mixture. The butt of the sucker should be cut off, dusted, and replaced over the cut surface of the parent corm, to act as a bait for the insect. The discarded sucker plant should be split to facilitate drying.

When the plantation is in bearing, a day should be set aside about once a fortnight to go through the bananas and cut down the spent stems. These should be split and laid open to dry. The corm surface should

then be cut more or less horizontally to detach a slice or a wedge and both sides of this, together with the upper, freshly-cut corm surface should be dusted. The slice or wedge should then be replaced somewhat loosely, supported on a small stone or piece of wood so as to leave a small space between the poisoned surfaces in which the weevils can shelter. A scattering of trash over the bait will prevent too rapid drying.

By carrying out these suggestions regularly, one to two poison baits should be prepared in each stool in the course of a year, that is, up to about 1,000 poison baits per acre per annum, in addition to those provided when desuckering. Mention may here be made of the fact that Paris green is not immediately lethal and that the insects may not die for several hours. Consequently, because of the secluded habits of the insect and the activity of scavenging ants and other insects, few dead weevils may be seen.

While the recommendations relating to the selection and treatment of planting material should ensure a satisfactory stand, it must be remembered that, at a later stage, the weevil may gain access to and breed in the plantation. Consequently, even in an apparently clean plantation, baiting should be carried out as a routine precautionary measure against the pest.

Damping-off.

F. W. BLACKFORD, Assistant Research Officer.

DAMPING-OFF is a very common seedling disease in seed-beds and seed-boxes and it also may occasionally affect seedlings in the field if the weather is very wet. Usually the first symptoms of the trouble to be noticed are patches of a few plants lying flat on the surface of the soil, often with their leaves quite green and healthy in appearance. A closer examination of such plants, however, will disclose the presence of a dark, water-soaked constriction of the stem at or near ground level. Other plants on the edges of such affected patches, though apparently healthy, will probably be found to have a similar, though smaller, water-soaked lesion on the stem. In a very short time this lesion—if left unchecked—will completely girdle the stem and the seedlings will topple over and finally die.

Nearly all species of plants may be attacked in the seedling stage, but once they are established and their tissues have become hardened, the plants are resistant to attacks of damping-off. Many soil inhabiting fungi are capable of causing this trouble, the commonest being species of Pythium. The disease is most prevalent in wet, shaded situations, simply because the causal fungi produce abundant spores under very moist conditions.

Control.

Sterilization of the seed-bed or seed-box soil by steam, fire or formalin will kill the causal fungi in the soil. As, however, infection may be introduced on the seed, that method of seed sterilization which is appropriate to the seed to be sown should be used prior to planting, in order to ensure that the seed-beds and seed-boxes are not re-contaminated. Any cultivation implements used in seedling raising should also be sterilized before being employed in the seed-beds or seed-boxes.

Healthy seedlings may be grown without resorting to sterilization of the soil, but if this is attempted, then special care must be taken in observing certain precautions which are also necessary—though not to the same extent—when soil and seed treatment have been carried out. The chief of these is to ensure that the surface of the soil in the beds be kept moistened but not too wet, and to achieve this the following procedure in seed-bed management should be adopted. A well-drained soil should be chosen for the seed-bed site and the seed-beds should be located in a sunny situation, and be covered, if necessary, to prevent scorching of the seedlings. If covers are used, these should be removed for an appropriate period during the day—the duration of the period depending on climatic conditions and on the nature and age of the seedlings—in order to obviate the production of weak, spindly plants. The uncovering of the seed-beds also permits of excess surface soil moisture being dried out. A further important point is the necessity for sowing the seed thinly and for thinning out the plants so as to permit of free circulation of air between the seedlings. The seed-beds should be watered regularly, making a heavy application from time to time rather than several lighter ones at shorter intervals over the same period of time. Furthermore, a light surface mulch of fine sand or well-rotted organic matter should be provided. Seed-boxes may be treated in a similar manner so as to provide the requisite degree of soil moisture.

If damping-off appears in a seed-bed or seed-box, Cheshunt mixture can be used to check the spread of the disease. This mixture is made up according to the following formula:—Powdered bluestone, i.e., copper sulphate, 2 parts, and fresh powdered rock ammonia, i.e., ammonium carbonate, 11 parts. The bluestone and rock ammonia should be thoroughly mixed together in a finely powdered condition and placed in a tightly stoppered container such as a glass or earthenware jar for a period of at least twenty-four hours before being used. When it is necessary to apply this fungicide, one ounce of the dry mixture should be dissolved in two gallons of water and the infected seed-beds or seed-boxes should be watered with the solution at a rate sufficient to thoroughly wet the soil. The solution will not adversely affect the seedlings in the treated beds or boxes, but it is essential that the can used for the watering be thoroughly washed after use, because the solution corrodes metals.

CHANGE OF ADDRESS.

Changes of address should be notified at least fourteen days before the date of issue with which the change is to take effect. The former address should be given as well as the full Christian names and surname of the subscriber.

Address all communications to the Under Secretary, Department of Agriculture and Stock, Brisbane.

WARTIME FOOD PRODUCTION

War Agricultural Committees.

RECORD OF RECENT ACTIVITIES.

THE object of the War Agricultural Committee organisation is to assist the primary producer in obtaining the means of production. The field activities of the District War Agricultural Committees are carried out by forty District Committees. Each Committee consists of three persons, an urban representative, a rural representative, and a Departmental officer as Chairman and executive officer. In addition, each District Committee may appoint as many local sub-committees as it deems desirable for the efficient performance of its duties.

Naturally, the major part of the work of the Committees devolves upon the Chairmen, who have also had to carry out their normal duties as instructors or inspectors. The execution of these dual duties has imposed a serious strain on many of these officers but it has been impossible to give them relief, or to create more districts, owing to the serious staff shortage caused by the enlistment of over 150 Departmental officers.

The activities of the District and local Committees are directed and co-ordinated by a small headquarters staff. Some idea of the extent of these activities may be gauged by the following resume of work carried out by the War Agricultural Committee organisation in Queensland during 1944.

Manpower.

Fifteen thousand applications for the release of Service personnel to rural industries were received, investigated individually, and reports made to the Manpower authorities. This assignment alone has been a colossal task for the Committees and Sub-Committees, aided by the much depleted Departmental staff.

The placement of some hundreds of prisoners of war on farms has involved the close scrutiny of applications from many hundreds of farmers in order to ensure the most equitable distribution of this source of rural labour.

Local week-end volunteer harvest labour was organised in different centres, particularly in the districts in the vicinity of Rockhampton, Kingaroy, Toowoomba and Ipswich, and 150 soldiers were placed, accommodated, and equipped as scrub cutters for drought relief in the Warrego and Maranoa. Particulars are now being collected regarding the further requirements of the latter district for scrub cutters in the near future.

Three hundred R.A.A.F. personnel and 150 prisoners of war were allocated to selected applicants for the peanut harvest, while there was extensive organisation of volunteer Army labour for the maize harvest on the Atherton Tableland.

War Agricultural Committees are responsible for the allocation, accommodation and equipment of all girls of the Women's Land Army engaged in harvesting of cotton, vegetables, potatoes, and fruit crops. Not only must the girls be allocated where their services are most needed but the good character of prospective employers must also be vouched for. During the year camps were established at Home Hill, Biloela, Stanthorpe, Boonah, Gayndah and Targinnie.

Machinery.

A total of 11,488 applications was received for the purchase of such agricultural machinery as is controlled under the National Security Regulations. All applications are the subject of individual investigation and recommendation as to immediate essentiality. Details of applications received during the year were:—

Tractors	4,329
Rotary Hoes	370
Harvesting Machinery	18
Engines	3,340
Shearing Equipment	228
Windmills	2,216
Irrigation Plants	908
Spray Outfits	79

The D.W.A.C.'s were charged with the distribution of the machinery purchased under the Government's £50,000 Machinery Purchase Scheme and 351 units of machinery were disposed of in this way.

Materials.

Wire, wire-netting and bore casing are controlled materials released for sale in accordance with priorities. The District Committees are consulted by the Department of Materials Supply regarding priorities and thousands of such applications have been dealt with directly. Similarly hundreds of applications for electric motors have been investigated, as also have applications for the extension of electric power lines in rural areas.

Numerous requests are received from primary producers regarding likely sources for the purchase of equipment and materials which are not controlled but which are in short supply. These requests at the rate of 4–5 per day have covered an extraordinary field ranging from motor trucks to tools of trade, refrigerators, dairy utensils, fibro cement, hessian, nails, timber, paraffin wax, and even a pre-fabricated dormitory.

Tyres and Petrol.

Chairmen of District Committees are usually consulted by the transport authorities regarding applications for tyres and petrol, made by primary producers, and thousands of such reports are made each year for the guidance of those authorities when making their allocations.

Crop Production.

Reports and forecasts of production trends in 25 commodities are compiled and transmitted to the Commonwealth Government each month and form the basis of the agricultural plans and policy of that Government. Continuous representations are also made in respect of impending shortages of machinery, materials, fertilizers, seeds, &c., so that these may be met as far as available supplies permit.

General.

In common with most organisations in Queensland, the War Agricultural Committee is working under the handicap of a totally inadequate staff for the job asked of it. It functions only because the officers engaged in this work do much more than their mere duty. Like most organisations it endeavours to do the best in circumstances usually beyond its control. That its place in the community is recognised by the primary producer is exemplified by the fact that during the year just passed applications for assistance and recommendation have been received from upwards of 25,000 producers.

DAIRY FARMING—ONE OF OUR BEST PROSPECTS.

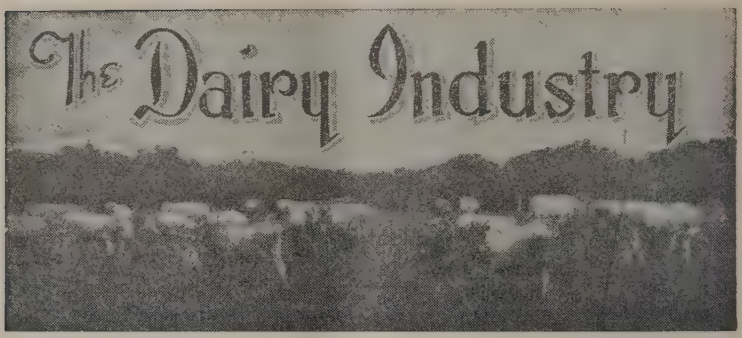
There is still some uncertainty as to what is going to happen to farming after the war, but there's no doubt about the maintenance and expansion of the dairy industry, which as a land-settling prospect for ex-servicemen and women is probably one of our best prospects. For a start, there is our home market, which will remain a constant factor, and, no doubt, an expanding factor, for the essential food value of milk and milk products is becoming more widely appreciated. Then there is the overseas market for dairy produce, of which an important factor is the long-term contract entered into with Britain to take all the surplus butter and cheese we can send. Then there are the nutritional needs of the war-torn countries, which the United Nations cannot afford to ignore.

In addition, there is the movement, gaining ground every day, for making more milk available to all classes of consumers, especially priority consumers, after the war. In fact, more milk may be regarded as a very practical scheme of social insurance—for the reason that the use of milk is not a remedial measure so much as a preventive measure against human ailments, a measure which starts with the children, with a new generation.

Milk is a protective food. It prevents illness. It saves the burdensome cost of illness in the home and the economic loss caused by illness. So in any system of social service milk in adequate daily supply should certainly be a first requirement. Economists may haggle over the cost of a general clean milk supply and distribution scheme, disregarding the dictum of to-day that "what is physically possible is economically possible." A healthy race of people will surely weigh against the accountant's ledger.

Then there are the new industrial uses for milk and its derivatives, all of which will broaden the market for dairy products. Therefore, we should have more cows—more and better cows. And with better dairy cattle go better pasture management, higher production of fodder crops for conservation as well as for direct feeding, and generally an expanding dairy industry organised and run efficiently in every department.

With the future of the industry seemingly assured, dairy farming may be regarded as one of the best prospects for successful land settlement and economical land use.



Milk and Cream Cooling.

C. R. TUMMON, Dairy Inspector.

WHEN freshly drawn from a cow, milk is approximately at blood heat, a temperature suitable for the rapid growth or development of bacteria. Milk also provides an excellent medium or food for bacterial life. As milk obtained from a cow in the usual way is never sterile (free from bacteria), it follows that considerable deterioration must occur to the milk before it reaches the factory, unless something is done to make conditions unsuitable for the development of bacteria. The practical way of doing this is to cool the milk as soon as possible after it is taken from the cow to a temperature low enough to retard bacterial multiplication. This can be accomplished by the use of a milk or cream cooler.

Obviously, on cream-producing farms, the milk should not be cooled before separation, but the cream run over the cooler as it comes out of the separator. However, on farms producing whole milk for cheese-making or human consumption, the milk should be run out of the milk vat, over the cooler, through the strainer, and then into the can.

Principle of Coolers.—There are various types of coolers available which perform a satisfactory job. Probably the type most frequently seen is one similar in size and shape to an old-fashioned washing board. There is a trough along the top into which the milk runs. In this trough is a series of small holes, through which the milk pours and then spreads out in a thin film running down the milk cooler towards the can. Water is circulated through inner tubes in the cooler, the water entering at a bottom corner and going out at a top corner. The water is circulated by a syphoning effect.

The amount of reduction of temperature of milk is influenced by the initial temperature of the water used and the ratio of water to milk or cream cooled. If a good water supply is available, the same water will not have to be used over and over again, and this will also assist in getting better cooling. On farms with a limited water supply, the water may be recirculated back into the storage tank, preferably an underground tank of about 400 gallons capacity for a herd of average size.

In addition to the benefit derived from the cooling, this process also aerates the milk or cream with the consequent removal or reduction of any animal odours or volatile feed flavours.

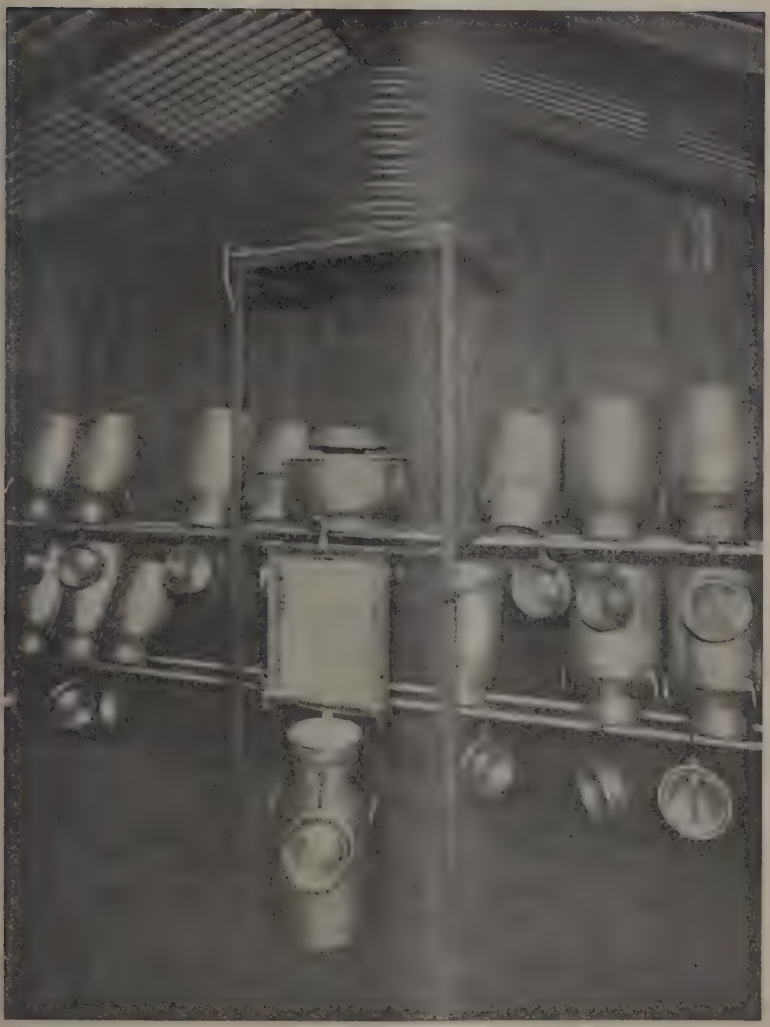


Plate 35.

Milk-cooling Equipment in a Queensland Dairy.—The water used in this small plant is pumped from an underground storage tank near the milking shed to the small overhead tank just before milk cooling begins.

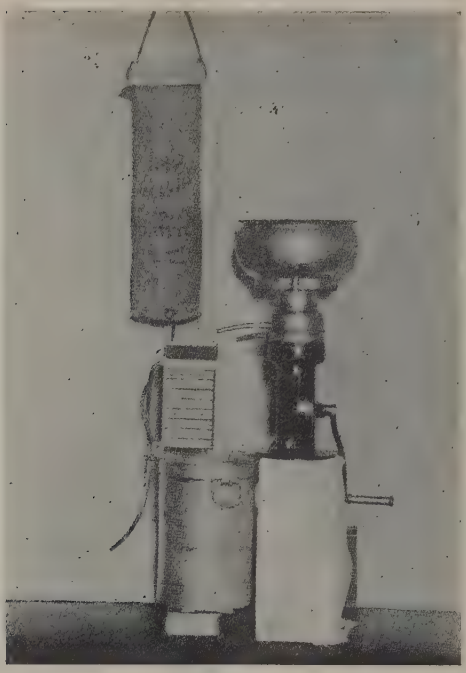


Plate 36.
A CHEAP CREAM-COOLING OUTFIT.

Milk or cream coolers are not expensive and should be regarded as a necessity in dairy shed equipment.

It may be seen, therefore, that while it is essential to apply clean methods in producing milk and cream, it is equally important to reduce temperature of both as soon as produced, in order to retard bacterial development and thus preserve quality.

BETTER COWS AND MORE FEED.

Because of large overhead expenses or fixed charges on the average dairy farm, many farmers aim to keep a large number of cows on the principle of reducing the overhead expenses per unit of live stock. In following this line of reasoning to its logical conclusion, many dairy farmers have increased their number of cows out of all proportion with their feed production and working capital, and to such an extent that they continually find themselves seriously handicapped by shortage of feed and funds.

It should be the aim of every dairyman to feed his cows a little better each year, and if he is exercising the proper care in the very important matters of breeding and feeding year by year, his herd should not be long in showing improved producing capacity. The

undesirable practice of pushing a few cows so that records are accomplished is of little use in the way of general profit, if the balance of the herd is only half-fed. In many cases, the low production of cows is the effect very largely of low yields of fodder crops and pastures. The number of dairy cows any given farm can support depends greatly on the labour available for crop production. On far too many dairy farms the herd has been increased in size out of all proportion to the crop production of the land.

Some dairy farmers assume that more cows will give more milk—for instance, 12 cows will produce more butter fat than 10 cows. Against that; let it be assumed that the supply of available food is limited to a fixed amount, and that the 12 cows would only have what the 10 cows should consume during the year. Then, one must come to the conclusion that the 12 cows would be less profitable than the 10, simply because of the deficiency of nutrients for the growth and maintenance of 20 per cent. additional animals, young stock included, also a waste of manual labour in like proportion; also there would be the cash from the sale of the two surplus cows sold, and the great satisfaction of being able to give the 10 cows their proper dues and a chance to show their ability to produce. There is a world of difference between feeding cows so they can exist, and feeding them so they can produce milk.

—L. VERNEY.

SOME EFFECTIVE LIMEWASHES.

The following are recommended by the Department as suitable for milking-sheds, bails, stables, and all outside work, and particularly for roofs, to keep the buildings cool:—

No. 1.

20 lb. lime (unslaked).
3 lb. common salt.
½ lb. alum.

Slake the lime with boiling water until the consistency of the wash is similar to thin cream. To increase its antiseptic properties, add ½ pint of crude carbolic to each bucketful of wash.

No. 2.

To half a bucket of lime add two handfuls of common salt and two handfuls of tallow. Slake slowly with cold water, stirring all the time. The quantity will make two bucketsful of wash, which will possess the properties of being very adhesive and unaffected by rain.

No. 3.

Slake lime with water and add sufficient skim milk to bring it to the thickness of thin cream. To each gallon add 1 oz. salt and 2 oz. of brown sugar or molasses dissolved in water.

The germicidal value of Nos. 2 and 3 can be increased by the addition of ¼ lb. of chloride of lime to every 30 gallons of wash.

Before applying the wash to wooden, metal, or stone structures, precautions should be adopted to clean the surface of foreign matter, thereby increasing the benefits of the solution. Care should also be taken to bring all crevices under the influences of the antiseptic.

For inside work in dairies and factories, with damp atmospheres, whitewashes should not be used, but the buildings should be painted with reliable sanitary paints.

Plate 37.

A WARTIME PASTORAL SCENE IN ENGLAND.—Dairy cattle on re-seeded marshland. Thanks to her climate and grass, Britain is pre-eminently a livestock-producing country. It is hoped that after the war by substituting temporary pasture (or 'leys') for the less productive permanent pasture which predominated before the war, the stock carrying capacity of Britain's pasturelands can be doubled.

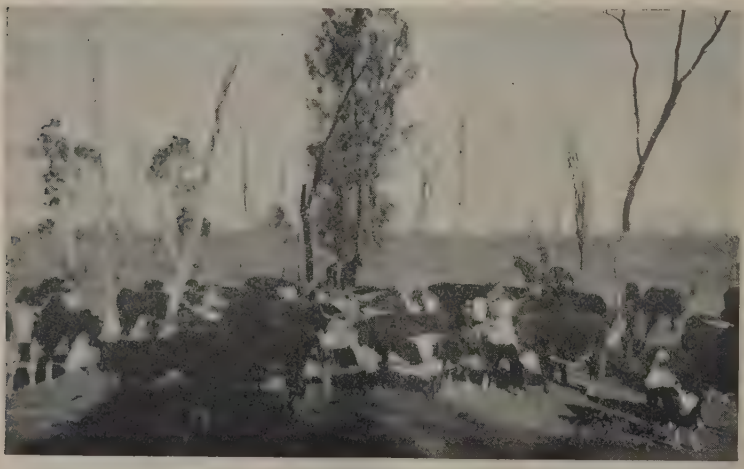


Plate 38.

HEREFORD BREEDERS ON KINDON, GOONDIWINDI.

Problems of the Suburban Pig Farmer.

E. J. SHELTON.

BECAUSE of increased values for prime quality bacon pigs, fat sows for small goods, and for all other grades of pigs—stores included—and of the improved prospects of the pig industry, many people, including ex-servicemen, have ventured into the business of feeding pigs on refuse food from encampments and similar establishments, and have made little or no provision for carrying on when supplies from such sources either diminish or cease.

Before entering on such a venture the beginner should have a knowledge of the legal aspect of pig raising. Farmers living within the Greater Brisbane Area and in areas under other local authorities must have official permission to keep pigs. This applies principally to suburban farms within town areas, and not to dairy farms and other piggeries in rural districts. The Brisbane City Council issues permits on approved conditions, and, when necessary, in co-operation with Government Departments. Applications for permission to establish piggeries in the Greater Brisbane Area should be made direct to the Health Department, City Hall, Brisbane, or to the appropriate local authority in other districts. The conditions attached to the granting of permits are arranged after an inspection of the applicant's property, and subject to compliance with *The Pig Industry Act* or other relevant legislation.

The feeding of pigs entirely on refuse food and vegetables cannot be recommended. At the present time there is a serious shortage of protein-rich concentrates (flesh formers) such as protein meal, pollard, and other foods, including cereals, normally used by pig raisers. Therefore, it is considered that in fairness to old-established pig raisers their requirements should have a first priority, as against those of newcomers to the industry.

To comply with the regulations under *The Diseases in Stock Acts* in Queensland and the *National Security Regulations* which deal with animal health, it is necessary to boil all refuse food before feeding it to pigs, although admittedly this involves extra work and expense. These regulations, however, were promulgated chiefly for the purpose of protecting the health of animals and making the feeding of food scrap a more congenial and profitable occupation.

Piggery Sanitation.

Regulations provide for the feeding of all putrescible food (*i.e.*, rapidly decomposing foodstuffs) on concrete or other impervious floors or from troughs of similar material which can be maintained in a sanitary condition; compliance need not involve undue expense. In the laying down of concrete for pig feeding floors and troughs, it should be the aim to make them acid proof as far as practicable. Details of an approved process for acid-proofing concrete may be obtained free of cost on application to the Department of Agriculture and Stock, Brisbane.

Pig premises should be kept as rat-proof as is possible, for apart from their destructiveness rats may carry disease from one property to another.

The keeping of pigs within municipal areas should, of course, be conducted on hygienic lines, and should not be allowed to become a public nuisance in any way.

Pig keeping permits usually provide for a strict limitation in the number of pigs that may be kept on small and inconveniently situated areas. The Brisbane City Council reserves the right to regularly (and without notice) inspect the properties where pigs are kept under permit, and work along these lines has proceeded smoothly for many years.

Farmers' Difficulties.

One of the principal difficulties at the present time is the short duration of contracts for removal of food scraps from military encampments. Six-monthly contracts may be necessary from the Army point of view, but they, obviously, increase the difficulties of the farmer who is almost solely dependent on camp refuse as pig food. Then there is the difficulty of obtaining tyres and petrol. The question of suitable labour is another problem. Work on suburban pig feeding farms is heavy and constant, involving usually a 5 a.m. daily departure for refuse collection. Then follows feeding and other routine work, and often, perhaps, a return to the city or suburbs in the afternoon for delivery of fat pigs or for collecting sawdust bedding for the sties.

Cultivation of small areas for fodder crops is possible on some properties, although generally this system of pig raising is strictly an intensive, sty-feeding one, exercise yards being available only for breeding stock.

Store Pigs.

Few suburban pigs raisers have the measure of success desired in the breeding of their own pigs, largely because of their intensive system of management and lack of greenstuff at a succulent stage. The unbalanced nature of table scrap as a food for breeding stock increases the suburban farmer's difficulties, especially now that pollard and meat-meal are strictly rationed and available only in limited supply, even under permit.

Thus the purchase of store pigs at distant country centres and at Cannon Hill and other large saleyards has developed to considerable dimensions and is continuing to expand. Fortunately the health of pigs in Queensland is generally very satisfactory, so that this transfer of young growing pigs from one area to another goes on with a minimum

of transit loss, but it remains a risky business, which has definite limitations. High values for quality stores and forward enough for feeding on food scrap reduces the margin of profit. Only when the numbers are large enough to warrant transport in trucks loaded reasonably to capacity can success be fully achieved. For this reason, it is desirable that in any policy of expansion, priorities should be restricted largely to old-established, well-kept suburban piggeries ahead of those who will not bring their farms up to date, and who still believe that any old food is good enough provided the pig will eat it.

Feeding Risks.

Food scraps referred to consist principally of refuse food from military encampments, hotels, restaurants, markets, stores, and domestic quarters. Such food is good only if fed under the best of conditions, especially in tropical climates, for it very soon deteriorates if the containers in which it is held are not kept thoroughly clean and the food delivered and used as soon as practicable after it becomes available.

It is possible for uncooked meat in camp refuse to become the medium through which the virus of swine fever may be conveyed. This disease is highly infectious and quickly fatal, and it may spread through a piggery with great rapidity. Fortunately, the scourge is not communicable to human beings, but man, birds, dogs, rats, and other "carriers" may be the means of conveying infection in a variety of ways.

It has been observed that many suburban pig farmers are careless in the feeding of food scraps and swill and spill portion of the contents of the container around the yards, thereby helping in the breeding of myriads of flies and attracting rats and other pests. There is far greater risk in the feeding of camp kitchen refuse, especially on small suburban holdings, than is the case with dairy or mixed farm piggeries where such food scraps are not regularly fed. People who are careless in their pig feeding practices are often ignorant of the great risk to the industry in the feeding of uncooked garbage food. The pig industry is far too valuable, especially in war-time, for such risks to be run.

If conveniences for boiling the food are not available, the Department of Agriculture and Stock, Brisbane, will advise where such equipment may be obtained.

In some cities in the United States of America, city garbage is processed and dried, resulting in the production of so-called "table scrap meal" or "garbage tankage." It is stated that the recovery of the fats in process of treatment enables the system to operate at a profit and with a greater measure of safety to the pig industry as a whole.

Suitable Scraps for Store Pigs.

Special care should be taken in the purchase of store pigs to be fed on food scraps—or on foods such as buttermilk, whey, soup and offal—as these foods are normally quite unsuitable for very young weaners and slips. Weaning age is a very critical period in the life of a pig, and if there is any setback in growth at this stage—and there often is where pigs are weaned early and sent to saleyards—the animal rarely recovers normal growth; and if also at this stage there is a change-over to scrap food, serious bowel disorders may result. So only well-grown, strong stores, three months old or more, should be used in the feeding of camp

kitchen refuse. Moreover, great care should be taken to protect the health of the pigs by isolating all new purchases until there is no longer a risk in their mixing with stock already on the farm.

Topping Up on Grain Essential.

While in the finishing stages of feeding, it is necessary to avoid overfattening; it is equally necessary to allow the animals some grain food to "firm-up" the fat and put the animal into prime condition. Camp kitchen refuse varies so greatly in its composition, and is so often in variable supply, that it is a risky food, which is likely also to be deficient in mineral and vitamin content.

However, where garbage-fed pigs are efficiently topped up on grain and some green food, there is no reason why the quality of the resultant pork should be low; in fact, normally, well supplied garbage-fed pigs should realise satisfactory prices.

Cleanliness in all operations, feeding from clean impervious food troughs affixed to impervious feeding floors, the boiling of all scraps, regularity in feeding and the rule of "small feeds and frequent feeding" should always be the practice in garbage feeding piggeries.

Trucking Pigs to Factories.

E. J. SHELTON.

DURING the summer months in Queensland, it is not unusual for prime quality bacon pigs to die in transit by railway to factories and works. The cash value of a pig that dies in transit does not cover the cost of disposal of the carcass, even admitting its fertiliser value, hence such losses represent a debit against the producer and a drain on the industry.

Chief causes of mortality in these cases may be summarised as follows:—

1. Exhaustion, contributed to by overfeeding on the farm or by feeding too near to the time of loading, resulting in the animals becoming travel sick, followed by lowered resistance to further ailment, distress, or accident. There is only one way of preventing this, and that is by not giving the animal any food at all on the morning of despatch, but providing drinking water only.

2. Undue delay in transit through a variety of causes often avoidable. The railways have done and are doing great wartime service, but there are times, especially over long distance travel, when pig wagons are left exposed to the heat and the direct rays of the sun. It is during very humid weather that transit losses are greatest, and not necessarily when temperatures are highest.

3. Overloading of railway wagons, and particularly the loading of pigs and calves in the same compartment and when it is already heavily loaded.

Under the *Pig Meats' Acquisition Scheme,* bacon pigs are now accepted at factories up to 200 lb. dressed weight, and this has led to an

increase all round in the weight of baconers received. This, in consequence, has necessitated a review of the number previously accepted as proper loading for various wagons used for this class of stock.

It is suggested, therefore, that the loadings be limited as follows:—

F.P. truck, no more than 24 to 26 pigs;

L. truck, 48 to 52 (24 to 26 on each deck);

M.G.P. truck, 80 to 86 (40 to 43 on each deck).

Should extra heavy baconers be consigned—i.e., pigs dressing 180 lb. or more—the numbers need to be further reduced; also, if choppers are included the allowance should be on the basis of one chopper being equal to two average baconers. Bacon factories much prefer to have pigs held back for a later trucking, rather than run the serious risk of losses through overloading.

Overheating is another frequent cause of transit loss. Pigs should not be allowed to become overheated, and they should always be loaded or unloaded by means of a properly constructed loading race. If they must be marketed during extreme weather conditions, they should be delivered to the receiving yards very early in the morning, and the vehicle used for cartage should be well covered so as to protect the animals from the direct rays of the sun, but providing ample ventilation.

Sometimes pigs have to be loaded into a railway wagon late in the previous evening for early morning departure of trains. Where that is necessary, particular care should be taken to partition off all big and very restless animals (old sows and stags) so as to prevent fighting and loss of rest.

Plate 39.

A "Strong Arm" Method in Dental Surgery.—If aged stags or "tusky" brood sows are being railed as "choppers" in trucks carrying bacon pigs, special care should be taken to remove their tusks; otherwise there is the risk of their seriously injuring the lighter weight pigs. This illustration shows a simple way of removing tusks from boars, stags, or aged sow pigs.

It is always an advantage, especially with pigs that have been "topped up" in enclosed pens, to allow these animals to have the run of a large grazing yard for two or three days before they are to be sent away. This accustoms them to exercise and being on their feet more than usual, and so they will be fitter to travel.

There are occasions, of course, when even after the animals have safely been delivered to receiving and trucking yards, they are mixed in with other pigs, and, often, that is when a fight starts. Quarrelsome pigs not only exhaust and injure one another, but sometimes fight until one or the other drops exhausted and does not recover.

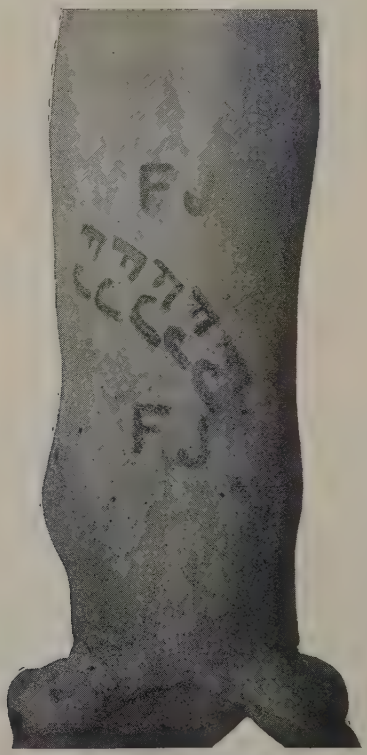


Plate 40.

HOW FIRE BRANDING SHOULD NOT BE DONE.—In sending pigs for slaughter irrespective of age or weight, branding is essential, and some factories still regard fire branding as the most satisfactory. Fire branding should, however, be done neatly with a small sharp copper or steel brand. The farmer who branded the pig shown in this illustration either must have been extremely suspicious or had no idea of the effect on the carcass of excessively cruel fire branding. Obviously, one brand would have been enough to identify the carcass.

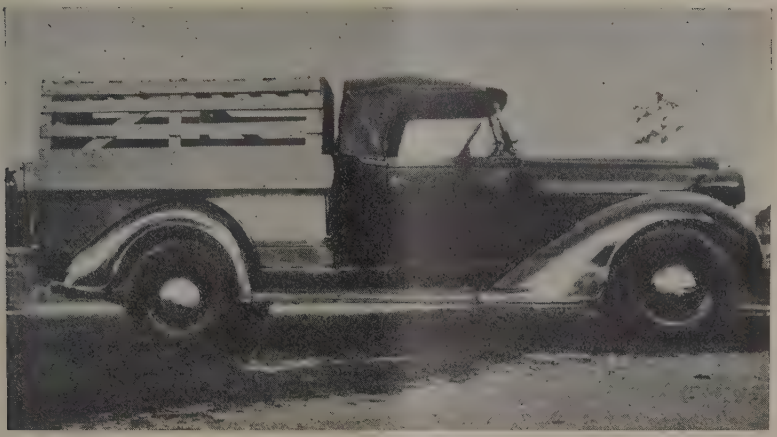


Plate 41.

Convenience in Pig Transportation.—Utility truck with porfable crate commonly used for the transport of pigs and calves from farm to the saleyard or trucking station. The portable crate is easily removable when necessary.

It is entirely wrong to attempt to load exhausted pigs into railway wagons in the hope that they will recover en route. Exhausted pigs rarely survive the journey. If given prompt attention and allowed to remain in the resting yards they usually regain sufficient strength to ensure their safe delivery.

Plate 42.

Good Accommodation, Ample Ventilation and Roomy Yards are Necessary for Pigs.—Too much maize feeding, however, results in second-grade or overfat carcases for present-day pig meat requirements.

Filling the Pig Trough.

C. C. SEWELL, Dairy Inspector, Gayndah.

Considerable inconvenience and waste is often caused by pigs milling about and getting into the feed troughs while they are being filled. A handy door, which eliminates this trouble, as well as the burden of lifting buckets over fences, is illustrated (Plates 43 and 44). The panel of fencing along the trough consists of 3 x 2 rails, with the necessary pickets to leave a door space 3 feet x 2 feet.

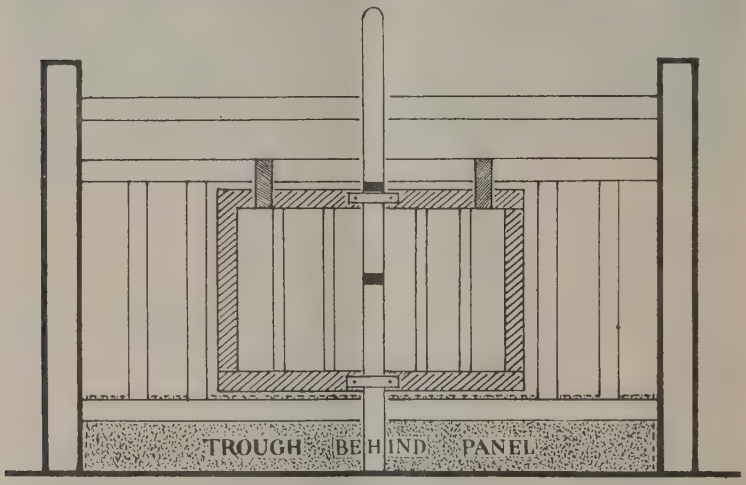


Plate 43.
OUTSIDE VIEW OF SWINGING GATE FOR FILLING THE PIG TROUGH.

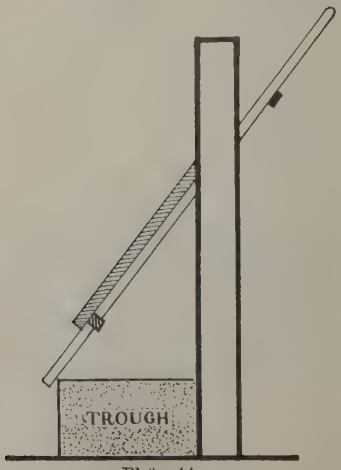
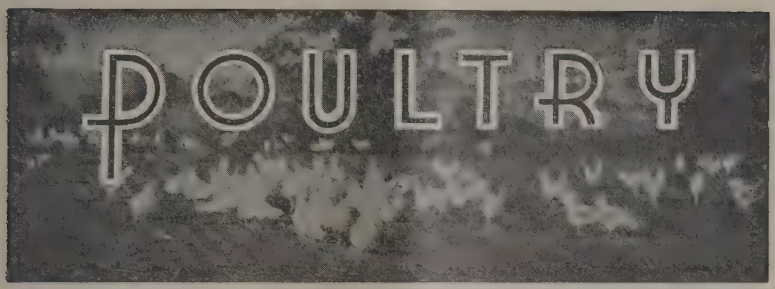


Plate 44.
END VIEW OF SWINGING DOOR OPENED ACROSS TROUGH TO PERMIT FILLING.

The door consists of an outer frame of 3 x 2, with 3 x 1 pickets. It is swung from the second top rail by means of two hinges, which can be made from piece of iron. To the centre of the door is attached a long piece of 3 x 2 which can be moved up or down for some inches.

To fill the trough, the door is swung inwards by pulling the long lever upwards and outwards. The lever is then pushed down so that it crosses the trough and holds the door open. When the trough is filled, the lever is withdrawn and the door falls back into place.



Home Storage of Eggs.

P. RUMBALL.

FOR the housewife, cold storage of eggs is largely out of the question, so simpler methods have to be used—such as packing the eggs in salt, or greasing them with suitable fats. These methods are, however, giving way to storage in solution, in which the eggs are immersed and held until required for use.

The choice of a suitable solution is determined by certain considerations. The shell of the eggs and its adjoining membranes are permeable to water and certain dissolved substances, and care must be taken that the preserving solution does not contain any ingredient likely to pass into the egg, thereby affecting its flavour or contaminating it in some way. Various substances have been tried and rejected for different reasons, so that at present the two solutions most commonly used are a solution of sodium silicate, better known as water glass, and lime water to which salt is usually added.

From investigations on the preservation of eggs other than by cool storage, the following specific solutions are recommended:—

(1) *Water Glass.*—Directions for its use are usually supplied, but for general purposes one part by measure of water glass and nine parts of water are used. The water should be first boiled and cooled.

(2) *Lime Water.*—Four parts of finely slaked lime are mixed with twenty parts of cold water, and the whole well stirred for several days to ensure saturation. One part of salt is then added, and the clear solution decanted and poured over the eggs, which should be placed in suitable wooden, cement, or galvanized-iron containers.

The eggs to be preserved should be clean and new-laid, and should not, at any time, have been subjected to a temperature much higher than 60 deg. F. It is advisable, therefore, to candle the eggs and reject cracked ones or any departing from this standard of freshness. Most investigators claim that water glass is the more satisfactory solution. The taste of the eggs stored in water glass is excellent, the air chamber the same size as before storage and the white has all the consistency of the new-laid egg. The eggs fry and poach, but nearly always crack on boiling unless the shell is first pierced at the broad end. The only other point is that the shells have a slight crusty deposit which is not removed on washing with water.

The underlying principle in the water glass method of preserving eggs is very simple. Being a colloid, it does not pass through the egg membrane; in fact, it has been ascertained that the silica content of eggs is not increased after two years' immersion in water glass. Further, that within three to seven days the water glass is deposited in the pores of the shell, completely sealing it. This, of course, is the reason why the shell has to be pierced before boiling. Once the egg is sealed it suffers no change from external causes, such as mould or bacterial invasion.

With lime water, apparently the egg is never completely sealed, and so permits the infiltration of water through the shell which fills the air chamber.

The efficiency of water glass and lime water as a means of preserving eggs is without question. Used with a rough system of cold storage —*i.e.*, paying no particular regard to constancy of temperature, but merely temperature limits—either method gives excellent results, with the preference in favour of water glass. The cost of the water glass is small; and it should never be used a second time.

Lime water possibly has one advantage, *i.e.*, that it is definitely antiseptic, and eggs stored in lime water are less likely to be affected by mould and bacterial contamination than those stored in water glass under the same conditions.

ALL FLESH IS GRASS.

As the dairy cow has to produce large quantities of milk rich in protein, it follows that it must be fed on foods rich in protein. There isn't very much difference between the food values of various grasses grown as introduced pasture on a dairy farm and which, in their early stages of growth, are equal in protein content to many concentrated foods—grains and so forth. The young shoots in a rain-freshened paddock are very rich in proteins, as a rule, and that's why cattle make a rapid recovery when grazing on pastures after rain following spells of dry weather, or after a burn. So, then, in the freshened pastures is the natural food, readily available, of the dairy cow. Good pastures are cheap, too, because with intelligent management they grow in large quantities and no labour is required in their feeding-off. Therefore, dairy pastures deserve special attention to maintain them for butter-fat production.

A PRACTICAL PLAN TO LIFT THE BUTTER OUTPUT.

District war agricultural committees below the border—representing the Richmond, Upper Clarence, Tweed, and Brunswick districts—have brought forward a plan to lift dairy production which provides for the return of man-power to dairy farms; extension of rural electrification; the fostering of better feeding of dairy cattle, combined with better pasture management and increased production of fodder crops, assisted in turn by the extension of farm mechanisation. To get higher returns from the dairy industry it was considered by the dairy farmers themselves that the surest and most effective ways were to raise production per cow, improve farming methods, observe strictly the principles of sound dairy practice, and to make use of labour-saving devices.

REGISTERED HATCHERIES

REGISTRATION of poultry hatcheries entails the blood testing of the poultry and the removal of birds found to be affected with pullorum disease, or are otherwise unsuitable for breeding purposes.

Hatchery owners who have applied for the registration or the removal of the registration of their hatcheries are listed hereunder:—

Owner.	Name of Hatchery.	Breeds.
N. W. Alfredson, Geebung street, Geebung	Selby	Australorps
V. H. Allen, Oxley road, Oxley	Alaura	White Leghorns, Australorps, Langshans, Rhode Island Reds
I. M. Armstrong, Randall road, Wynnum West	Chanticler	Australorps
A. J. Barnes, Handford road, Zillmere	Zillmere	White Leghorns, Australorps, and Langshans
J. S. Bauer, Oakwood, Bundaberg	Triangle	Australorps and White Leghorns
C. and M. Birney, Archerfield road, Darra	Evenley	White Leghorns and Australorps
R. H. Bowles, Glenmore road, North Rockhampton	Glen Stud	White Leghorns and Australorps
C. W. Bowtell, 4 Payne street, Toowoomba	Downs	Australorps and White Leghorns
John Bowtell, North street, Wilsonton, Toowoomba	Downs	White Leghorns, Brown Leghorns and Australorps
E. J. Brazier, 109 Bridge street, Toowoomba	Miamba	Australorps and White Leghorns
H. Brazil, Beaudesert road, Eight Mile Plains	Brazil's	Australorps, White Leghorns, Rhode Island Reds, Welsummer, and Minorcas
C. M. Bryce, Postal street, Oxley	Celny	White Leghorns and Australorps
Percy J. C. Bygrave, Box 24, P.O., South Brisbane	Craigan Farm	Australorps and White Leghorns
J. Cameron, Oxley Central	Cameron's	Australorps and White Leghorns
W. Carr and **A. B.** and **A. T. M. Watson**, Logan and Creek roads, Mount Gravatt	Bellview Stud	White Leghorns and Australorps
J. L. Carrick and Son, Manly road, Tingalpa	Craigard	White Leghorns and Australorps
A. R. Chard, Chard's road, Bundaberg	Sunnyland	Australorps, White and Brown Leghorns
N. Cooper, Zillmere road, Zillmere	Graceville	White Leghorns
R. B. Corbett, Woombye	Labrena	White Leghorns and Australorps
Alfred Cowley, The Gap, Ashgrove	Melody	White Leghorns
C. M. Cullinane, Upper Mount Gravatt	Rushoin	White Wyandottes and Australorps
V. R. Dearling, 85 Holberton street, Toowoomba	Downs	White Leghorns, Australorps, and Brown Leghorns
E. Eckert, Head street, Laidley	Laidley	Australorps, Langshans, and White Leghorns
Elks and Sudlow, Beerwah	Woodlands	White Leghorns and Australorps
F. G. Ellis, Old Stanthorpe road, Warwick	Sunny Corner	Australorps
W. Ellison, junr., Bald Knob, Landsborough	Willeden	White Leghorns
C. Erbacher, 75 Ramsay street, Toowoomba	Rhode Island Red	Australorps
L. D. Fraser, 69 Ramsay street, Toowoomba	Downs	Australorps
W. H. Gibson, Manly road, Tingalpa	Gibson's	White Leghorns and Australorps
Gisler Bros., Wynnum road, Wynnum	Gisler Bros.	White Leghorns and Australorps
H. J. Greer, Church road, Zillmere	Iona	White Leghorns and Australorps
W. G. Gregory, Deeragun, Ingham Line	Rocks Stud	White Leghorns, Australoprs, and Rhode Island Reds
F. P. Grillmeier, Milman	Mountain View	Minorcas and Australorps
T. A. Haggquist, Edmonton	White Rocks	
G. Hall, Kin Kin	Kin Kin	Australorps
P. Haseman, Stanley terrace, Taringa	Black and White	White Leghorns and Australorps
F. E. Hills, Sims road, Bundaberg	Littlemore	Rhode Island Red, Australorps White Leghorns, White Wyandottes, and Langshans
A. E. Hoopert, 24 Greenwattle street, Toowoomba	Kensingson Stud	Australorps and Rhode Island Reds
H. Hufschmid, Ellison road, Geebung	Meadowbank	White Leghorn, Brown Leghorns, Minorca, Australorps, and Rhode Island Reds
E. C. Knoblauch, Mount Gravatt	Lucinda Park	White Leghorns, Australorps, and Anconas
E. C. Kolberg, Handford road, Zillmere	Gerbera	Australorps
W. A. Lehfeldt, Kalapa	Lehfeldt's Australorp	Australorps

REGISTERED HATCHERIES—*continued.*

Owner.	Name of Hatchery.	Breeds.
W. A. Luke, 108 Russell street, Toowoomba ..	Downs	White Leghorns, Brown Leghorns, Australorps, and Rhode Island Reds
J. McCulloch, Whites road, Manly	Hindes Stud ..	White Leghorns, Brown Leghorns, and Australorps
W. S. MacDonald, Babinda	Redbird	Rhode Island Reds and Anconas
A. Malvine, Waterworks road, The Gap, Ashgrove	Alva	Australorps and White Leghorns
H. L. Marshall, Kenmore	Stonehenge ..	White Leghorns and Australorps
W. J. Martin, Pullenvale	Pennington	Australorps, White and Black Leghorns
A. Mawhinney, Robinson road, Aspley ..	Aspley	White Leghorns, Australorps, and Rhode Island Reds
C. Mengel, New Lindum road, Wynnum West..	Mengel's	Australorps
D. G. Miller, Nerimbera, via Lakes Creek ..	Nerimbera	White Leghorns
E. C. Moore, Hyde road, Yeronga	Yeronga	Australorps and White Leghorns
C. J. Nielsen, Kensington street, Bundaberg ..	Bona Vista ..	Australorps, White Leghorns, and Rhode Island Reds
S. V. Norup, Beaudesert road, Cooper's Plains	Norup's	White Leghorns and Australorps
H. Obst and Sons, Shepperd	Collegeholme ..	White Leghorns and Rhode Island Reds
A. C. Pearce, Marlborough	Marlborough ..	Australorps, Rhode Island Reds, Light Sussex, White Wyandottes, Langshans, Khaki Campbell Ducks, Indian Runner Ducks, and Bronze Turkeys
P. A. Pearce, Paynes road, The Gap, Ashgrove	Berea	White Leghorns, Australorps, and Rhode Island Reds
W. J. Perkins, 110 Neil street, Toowoomba ..	Rhode Island Red ..	Rhode Island Reds
G. Pitt, Box 132, Bundaberg	Pitt Poultry Breeding Farms	White Wyandottes, White Leghorns, Brown Leghorns, Australorps, Rhode Island Reds, Langshans, and Light Sussex
J. C. and **G. E. Raff,** Musgrave road, Sunnybank	Brundholme ..	White Leghorns, Australorps, and Rhode Island Reds
G. R. Rawson and Son, Upper Mount Gravatt..	Rawsons'	Australorps
J. Richards, P.O., Atherton	Mountain View ..	Leghorns and Australorps
J. Rogoff, Woodridge	Kingston road ..	Australorps
C. L. Schlencker, Handford road, Zillmere ..	Windyridge ..	White Leghorns
S. E. Searle, New Cleveland road, Tingalpa ..	Tingalpa Stud ..	White Leghorns and Australorps
N. G. Seymour, Palm Avenue, Sandgate ..	Sohufa	Australorps, Black Leghorns, and White Leghorns
J. Schumann, 291 Bridge street, Toowoomba	Downs	White Leghorns, Brown Leghorns, Rhode Island Reds, and Australorps
W. B. Slawson, Mitchelton	Kupidabin	White Leghorns, Australorps, and Light Sussex
T. Smith, Isis Junction	Fairview	White Leghorns and Australorps
H. A. Springall, Progress street, Tingalpa ..	Springfield	White Leghorns
A. Stehn and Son, 285 West street, Toowoomba	Red Spot	Australorps, Rhode Island Reds, White Leghorns, and Brown Leghorns
R. Stockman, Kairi	Tinaroo	White Leghorns and Rhode Island Reds
R. Taylor and **H. Cuerel,** 370 Montague road, Hill End	Bel-Air	Australorps and White Leghorns
E. G. Thorpe, Box 36, Goomeri	Thorburn Electric ..	White Leghorns, Australorps, and Rhode Island Reds
W. J. B. Tonkin, Parkhurst, North Rockhampton	Tonkins'	White Leghorns, Australorps, and Rhode Island Reds
J. R. Twigg, Crown street, Geebung	Piccadilly	White Leghorns, Australorps, and Langshans
G. A. C. Weaver, Herberton road, Atherton ..	Weavers'	Australorps, White and Brown Leghorns, Anconas, Minorcas, Rhode Island Red, Indian Game, and Bantam
F. H. J. Weeks, Bajool	Glen Brae	White Leghorns and Australorps
Mrs. V. M. White, Archerfield road, Darra ..	Viola	White Leghorns and Australorps
Mrs. L. M. Wooller, Huet street, Rockhampton	Riverview	White Leghorns and Australorps
E. M. Winter, 5 Rose street, Toowoomba ..	Downs	White Leghorns
P. A. Wright, Laidley	Chillowdeane ..	White Leghorns, Brown Leghorns, and Australorps

ANIMAL HEALTH

"Blight" in Farm Animals.

A. L. CLAY, Government Veterinary Officer.

BLIGHT is an inflammatory condition affecting one or both eyes of farm animals, especially cattle and sheep; pigs are rarely affected, but it is met with fairly commonly in horses. It is distinctly seasonal in occurrence, being largely confined to the summer months.

Method of Spread.

The condition is in the nature of an infectious disease and the weight of evidence is to the effect that flies are the principal agents in its transmission. Close contact, as when cattle are yarded for milking or for dipping, branding, and other purposes, especially in dusty yards, almost certainly induces its spread.

Symptoms.

Symptoms are well known to most farmers and graziers. One or both eyes may be affected. There is an excess of tears in the affected eye and the cheek becomes tear stained. Bright sunlight increases the flow of tears and generally adds to the animal's distress.

Close examination will reveal in most cases a slight nasal discharge which is watery in character. The conjunctiva (inner surface of the eye lid) is inflamed and swollen and a scum or cloudy film gradually covers the eye ball; this film may show the presence of many highly injected blood vessels not seen in the normal eye.

Without doubt there is pain, and in many cases there is considerable loss of condition. Temporary blindness may occur in which case loss of condition is much more marked.

Course of Disease and Treatment.

Recovery will in most cases occur in 7 to 14 days without treatment. This makes it difficult to assess the value of any treatment undertaken. A small proportion of affected animals (high in horses) takes the disease in a severe form and some may lose the sight permanently. The capacity of cattle to recover, even when affected severely, is extraordinary.

Substances which have been used in the past as cures are many and various, a sure indication that none among them is outstanding. Kerosene, sugar, salt, calomel, quinine sulphate, watery drops of iodine, castor oil, milk, zinc sulphate, argyrol, mercurochrome, silver nitrate, and oxide of mercury ointment all have their advocates.

Zinc sulphate has been recommended by the Department of Agriculture and Stock for many years and probably shortens the course of the disease by several days. It is, however, very necessary to use the drops in the eye at least twice daily and preferably four to five times daily. This, of course, introduces serious difficulties in practical application.

To make a solution suitable for use, dissolve ¼ oz. of zinc sulphate in 1 pint of water in which ½ to ¾ oz. of boric acid has been previously dissolved. If argyrol is used, it is preferable to use a 20 per cent. solution rather than the 50 to 10 per cent. solutions which have been recommended in the past.

More recent remedies which may be tried with perhaps better prospects of effecting a speedy cure are:—

(i.) Sulphanilamide, 5 per cent. in castor oil;

(ii.) Metaphen, 1 part dissolved in 2,500 parts of water;

(iii.) "Prontosil" Soluble (2½ per cent. solution).

All of these preparations can be obtained from chemists. As with zinc sulphate, they are best used four to five times daily. The drops used, whichever may be selected, are best instilled into the eye with an ordinary eye dropper (as used in treating human eye ailments). In the case of the castor oil preparation, it may be necessary to have the opening in the tip of the dropper slightly enlarged.

If an eye dropper is unobtainable, perhaps because of wartime shortages, then an oil can will suffice, provided it is thoroughly cleaned beforehand.

Valuable animals should be kept in a shed or barn so as to gain protection from direct sunlight. The services of a veterinary surgeon should, if practicable, be enlisted, as he has usually other drugs at his disposal which will help to prevent permanent damage to the eye.

PASTURE POINTERS.

There are several ways of maintaining and improving pastures, including, first of all, the growing of grasses which have a high feeding value; then the top dressing of grass land; and after that rotational grazing—or, in other words, feeding the grass off while it is still in its young stage of growth. Then, too, there is the renovation of pastures.

In selecting grasses for dairy pastures, thought should be given to their local adaptability. It's no good, for instance, putting in grasses which don't do well or which are unlikely to do well in a particular place. What has to be considered is their adaptability to particular farm conditions, then their period of growth, their nutritive value, their palatability, and suitability for grazing and hay-making. The length of the grazing season is extended and the returns of butter-fat increased by top dressing if top dressing can be done with the labour and material available.

Rotational grazing, on the other hand, doesn't involve so great an outlay—that is, of course, if the necessary fencing material, admittedly so very hard to get these days, is available. But subdivision of paddocks, if it can be done, is necessary for rotational grazing on an economical scale—and unless it's economical as measured in terms of butter-fat production, it would be better, perhaps, to try some other way of increasing butter-fat yield. The fertility of the land has to be maintained if pastures are to carry a dairy herd economically.

The sowing of improved pasture grasses and the practising of rotational grazing are sure ways of improving cream returns; and improvement of cream returns is the best way dairy farmers can help in the drive for greater production of essential foodstuffs for the Armed Forces, for our own people, and those other peoples who are looking to Australia to make up for the food deficiency from which they are now suffering.

Plate 45.
STORE CATTLE ON WYAGA, GOONDIWINDI.

Plate 46.
DORSET HORNS ON THE DARLING DOWNS, QUEENSLAND.

PRODUCTION RECORDING.

List of cows and heifers officially tested by officers of the Department of Agriculture and Stock which qualified for entry into the Advanced Register of the Herd Books of the Australian Illawarra Shorthorn Society, the Jersey Cattle Society, and the Guernsey Cattle Society, production records for which have been compiled during the month of December, 1944 (273 days unless otherwise stated).

Name of Cow.	Owner.	Milk Production.	Butter Fat.	Sire.
		Lb.	Lb.	
AUSTRALIAN ILLAWARRA SHORTHORN.				
Mature Cow (Standard 350 lb.).				
Jamberoo Marjorie 4th	M. J. Brosnan, Clifton	11,887·5	432·879	Brooklyn Terrace Banker
Mount Camp Scarlet	W. Caldwell, Bell	8,746·69	367·324	Fairfield Barrister
Senior, 3 Years (Standard 290 lb.).				
Jamberoo Winnie 3rd	M. J. Brosnan, Clifton	10,449·5	398·888	Greyleigh Valiant
Robina Choice	D. Robinson, Womina	7,672·	302·157	Rosenthal Sir Regent
Junior, 3 Years (Standard 270 lb.).				
Alfa Vale Model 19th (365 days)	W. H. Thompson, Nanango	14,214·85	675·731	Penrhos Pansy's Pride
Glen Idol Daphne 8th	P. Doherty Estate, Gympie	6,902·7	314·125	Blacklands Count
Junior, 2 Years (Standard 230 lb.).				
Glen Idol Jenny 4th	P. Doherty Estate, Gympie	6,920·7	263·581	Blacklands Count
Glen Idol Daphne 11th	P. Doherty Estate, Gympie	6,354·4	241·834	Blacklands Count
JERSEY.				
Mature Cow (Standard 350 lb.).				
Windsor Lady Evelyn	Johnson Bros., Gleneagle	12,104·5	549·226	Wingate Bobs
Brooklands Royal Madge	Johnson Bros., Gleneagle	10,521·95	494·587	Redford Earl Victor
Junior, 4 Years (Standard 310 lb.).				
Westbrook Eva 12th	Farm Home for Boys, Westbrook	6,525·7	346·874	Westbrook Ambassador 28th
Junior, 3 Years (Standard 270 lb.).				
Westbrook Tulip 115th	Farm Home for Boys, Westbrook	7,969·35	429·096	Orphanage Comet
GUERNSEY.				
Senior, 2 Years (Standard 250 lb.).				
Laureldale Vida	W. A. K. Cook, Witta	8,453·55	400·037	Minna Murra Topsy's Sequel 2nd

GENERAL NOTES

Control of Seed Oats for 1945 Sowing.

Under *National Security Regulations*, an order has been gazetted controlling the sale, use, and transport of oats in New South Wales. This action has been taken in order to conserve the available supplies of oats for seed purposes next season, as this season's oat crop in that State is only about 30 per cent. of normal. Under paragraph 4 of the *Oat Control Order*, it is stated that in the case of interstate sales or transport, the Queensland purchaser must obtain a certificate from the Queensland Department of Agriculture at Brisbane to the effect that the grain is required for seed purposes only. On presentation of this certificate to the appropriate New South Wales authority, a permit to purchase and/or transport may be obtained.

It will be unnecessary for farmers who order seed oats from a merchant in Queensland to obtain a certificate as such cases will be covered by the certificate issued to the local merchant or agency.

Because of the heavy demand for the small quantity of seed oats available, there can be no guarantee that any great quantity of seed oats will be obtainable from the Southern States, and it is therefore highly desirable that Darling Downs farmers and merchants holding oats from the recent harvest should reserve all sound oats of suitable varieties for seed purposes, rather than permit their use or sale for stock feed. Many farmers will be obliged, because of this seed shortage, to use alternative crops, principally wheat, for their sowings of winter green feed in the coming season.

Regulations under Stock Acts.

Regulations complementary to the recent amendment of *The Diseases in Stock Acts* relative to the testing of cattle normally supplying milk to the Greater Brisbane Area, for the purpose of the eradication and prevention of tuberculosis in stock, have been approved.

The Dairy Products Stabilisation Board.

An Order in Council has been issued under *The Dairy Products Stabilisation Acts, 1933 to 1936*, appointing representatives of the Butter and Cheese Boards and the Director of Marketing to be members of the sixth Dairy Products Stabilisation Board for the period from 1st February, 1945, to 31st January, 1948.

Representatives of the Butter Board are Messrs. A. H. Bolow (Gladstone), A. G. Muller, M.L.A. (Boonah), J. McRobert (Maryborough), T. F. Plunkett, M.L.A. (Beaudesert), J. Purcell (Toowoomba), and W. J. Sloan (Malanda). The Cheese Board representatives are Messrs. R. C. Duncan (Pittsworth), D. G. O'Shea (Southbrook), and M. McIntyre, M.L.A. (Mount Tyson).

Meat and Wheat Offals—Purchase Permits.

The Minister for Agriculture and Stock (Mr. T. L. Williams) announced that permits to purchase blood, meat, meat and bone meals, bran and pollard for feeding to pigs, dairy cattle, calves, and poultry during the period February to May, both inclusive, has been posted to applicants entitled to receive them. From 1st February, 1945, it will not be possible for anyone to purchase these meals without presentation of a permit, except where purchases of bran and pollard are made in bushel lots or less; and for this purpose, permits have been issued to storekeepers entitling them to obtain a certain quantity for resale in these small amounts.

Commercially prepared mashes for poultry are not under control at present. Permits have been issued to all manufacturers of these registered mashes, entitling them to obtain specific quantities of the necessary rationed ingredients for production of poultry mashes, and which, until further notice, may be purchased without having to surrender a permit.

Queensland Leads in Feed Rationing.

Thus *The Poultry Farmer* (New South Wales) in a recent issue:—

"Queensland leads the way. Under the National Security (Agricultural Aids) Regulations it will be impossible to purchase bran, pollard, bloodmeal, meatmeal and meat and bonemeal on and after February 1 within the State of Queensland without a permit issued by the Department of Agriculture and Stock. All permits issued will have the same status. When permits are issued, first consideration is being given, in the case of bran and pollard, to the needs of dairymen supplying milk for human consumption and poultry-keepers producing on a commercial basis. Commercial poultry-keepers and pig-raisers have first priority with animal protein meals.

"Produce merchants who cater for backyard-flock owners, purchasing in lots of a bushel or less, will only receive permits to sell if bran and pollard are available after the needs of the priority or commercial users are satisfied. If such merchants receive stocks they will have to ration same equitably amongst their clients. This action of ensuring that the bona-fide commercial producer secures first call on available supplies is praiseworthy, as it is plainly evident that the phenomenal demand by backyarders has often jeopardised the supply to commercial farmers, wholly relying on poultry production for a living.

"Appreciating the need for some measure of elasticity in apportioning the supplies available, according to seasonal requirements of flocks, the year has been divided into three rationing periods—February to May, June to September, and October to January.

"Queensland is the first State to put any equitable scheme of poultry food distribution into effect, and whilst, no doubt, there will be some criticism, the scheme is planned to provide the greatest good for the greatest number, and to ensure maintenance of flocks and maximum egg production."

INFORMATIONAL AND ADVISORY SERVICES.

Information and advice on matters relating to primary production may be obtained from the Department of Agriculture and Stock, William Street, Brisbane, B. 7, or from appropriate officers in country centres. The following list shows where Departmental advisory officers are stationed:—

GENERAL AGRICULTURAL CROPS AND PASTURES: Brisbane (Tel. B 1541); Toowoomba; Chinchilla; Warwick; Laidley; Boonah; Kingaroy; Bundaberg (Court House); Monto; Rockhampton (cnr. Bolsover and Fitzroy Streets); Mackay (Court House); Ayr; Home Hill; South Johnstone (Bureau of Tropical Agriculture); Atherton; and Mareeba.

COTTON: Brisbane (Tel. B 1541); Dalby; Kingaroy; Gayndah (Court House); Monto; Biloela (Cotton Research Station); Home Hill; Ayr. All advisors on general agriculture also deal with cotton culture.

SUGAR-CANE: Brisbane (Tel. B 1541); Bundaberg (Sugar Experiment Station, Tel. 228); Mackay (Sugar Experiment Station, Te Kowai, Tel. 17); Innisfail (Tel. 271); Meringa (Sugar Experiment Station, Tel. Gordonvale 95); Cairns (Tel. 2589).

FRUIT AND VEGETABLES: Brisbane (Tel. B 1541); Coolangatta; Southport; Toowoomba; Warwick; Stanthorpe; Wallangarra; Dayboro; Nambour (Field Station, Tel. 175); Gympie; Gayndah (Court House); Rockhampton; Bowen; Townsville; and Cairns.

Advice on vegetable-growing is obtainable also from general agricultural advisory officers.

INSECT PESTS: Specialist Officers at Brisbane (Tel. B 1541); Gayndah (Court House); Rockhampton (cnr. Bolsover and Fitzroy Streets), Townsville.

PLANT DISEASES: Specialist Officers at Brisbane (Tel. B 1541) and Toowoomba (Long Street, Tel. 1990).

IDENTIFICATION OF PLANTS: Brisbane (Botanic Museum and Herbarium, Botanic Gardens, Tel. B 8243).

BEEKEEPING: Brisbane (Tel. B 1541).

SEED-TESTING: Brisbane (Tel. B 1541).

SHEEP AND WOOL: Brisbane (Tel. B 1541); Blackall.

DAIRYING AND CATTLE-RAISING: Officers of the Dairy and Stock Branches are stationed in a large number of country towns.

PIG-RAISING: Brisbane (Tel. B 1541).

POULTRY-RAISING: Brisbane (Tel. B 1541); Boonah (Stock Office).

VETERINARY SERVICES: Brisbane (Tel. B 1541); Yeerongpilly (Animal Health Station, Tel. JY 8005); Toowoomba (Tel. 547); Murgon; Rockhampton; Clermont; Townsville (Animal Health Station, Oonoonba, Tel. Townsville 484); Atherton.

Rural Topics

Cream Supply in Summer.

Early and often applies to the delivery of cream to butter factories in summer as an important point in dairy practice. In some districts, or localities, a daily delivery is, of course, not always practicable, but until the end of March nothing less than a four-times-a-week delivery should be the rule.

The holding up of the cream carrier to make sure that the morning's cream should be added to that already in the can should be avoided. The mixing of newly produced, warm cream with older and cooler cream is often the cause of the whole can of cream being graded down. Dairy farmers, therefore, would be well advised to have their cream ready for the cream carrier when he comes along. If the morning's cream hasn't cooled down and isn't ready on time, then that particular cream should be held back for the next delivery; if this is done, better factory results will be obtained. As summer is now here, it would be just as well to remember that cream should be supplied with a butter-fat content of at least 38 per cent.

Cows Can Be Kept Clean.

Then every care should be taken to prevent contamination of milk, for clean milk means high-grade cream. The cow's body is a serious source of milk contamination, either through bacteria or visible dirt, or both. The trouble is caused by particles of manure, hair, dandruff, or other dirt dropping directly into the bucket during milking. If the parts of the cow are properly cleansed before milking, this contamination should not happen. If strict cleanliness is observed in every milking operation, there should be very little risk of contamination.

Cows can be kept clean easily if the hair on the udder, flanks, and tail is clipped short; much less dirt will then cling to the coat of the animal.

Marking Up Factory Grades.

The proper cleansing of dairy utensils is obviously necessary in clean milk production—and clean milk, of course, means clean cream and high marking of factory grades. Dirty containers are probably the most common cause of cream contamination. In washing and sterilizing dairy utensils, the main points to observe are—

Rinse away all milk material with lukewarm water.

Then, thoroughly scrub each utensil with a brush and water which contains washing soda. This second water should be hot, but not so hot as to be uncomfortable to the hands of the person doing the job.

After scrubbing and washing, the utensils should be again rinsed in warm water.

When that is done, the utensils should be placed in boiling water—not just very hot water, but *boiling* water—and allowed to remain in the boiling water for, say, three minutes.

The utensils should be then placed to drain in an airy position where they will dry quickly. Cloths should *not* be used for drying the cans and other utensils after they have been scalded.

Dairying Points to Remember.

Keep the milk room and bails thoroughly clean. Strain the milk through an all-metal strainer. Cloth strainers should *not* be used. Use a tinned metal plunger for stirring the cream. Wooden stirrers should *not* be used. Cool milk to as low a temperature as possible without delay, and *keep* it cool.

The lifting of dairy output to the level now necessary to meet the demands of Australia's war effort is really a matter of sound methods in every branch of dairy practice. Good milk means sound cream; sound cream means top-grade butter; and top-grade butter means more profit to the producer, as well as the satisfaction he gets out of doing a job of first rate national importance.

Agriculture in Japan.

What the Jap. has to offer all his neighbours whom he wants to take into his co-prosperity sphere isn't very much as shaped by the picture of Japan's primitive agriculture, as painted in a recent number of the *Journal of the British Ministry of Agriculture*. "Generally speaking," it says, "the arable lands of Japan are subdivided into extremely small holdings—the average is less than 2½ acres for each farming family on the main islands. . . . . Both the methods of agriculture and the implements used are primitive. The socalled plough commonly used differs little from that employed in Egypt during the times of the Pharaohs. Hoes, spades, harrows, sickles, and flails all call for hand labour."

Country Libraries—A Welcome Request.

Recently there came a request from a committeeman of a country school of arts for a regular posting of agricultural publications for a farmers' reference library his committee is establishing. Through the Department of Agriculture and Stock, arrangements have been made to send regularly the *Queensland Agricultural Journal*, the *Queensland Journal of Agricultural Science*, and all other departmental publications—including, of course, the *Queensland Agricultural and Pastoral Handbook* series. Not only that, but a list of the latest text books on agriculture and animal husbandry has been sent which, it is thought, should form the nucleus of a good agricultural reference library. Although the idea of an up-to-date reference library in every country centre isn't new, this evidence of a reviving interest of farmers in modern agricultural literature—which isn't necessarily stodgy nor over-technical—is, it is thought, further recognition of the need for a new outlook on rural industry.

Speaking generally, an easily accessible general reference library in every country town and district centre is a definite need. Farmers require something better in the form of a cultural centre than the usual frowsy school of arts building in which a shabby billiard-room is the "school" and a much-thumbed fiction library the "arts." With acceleration of the movement for real adult education started in Brisbane recently, and a revival of external University lectures, the farmer and his family need not feel out of it. There is such a thing as mental stagnation, or starvation, a thing to be avoided at all costs. In every country town there should be, obviously, a real cultural centre.

The success of the Army Education Service, which provides for arts and crafts, is an indication of what can be done in the way of adult education or re-education; and there doesn't seem to be any reason why the principle of Army education shouldn't be extended to the people's peacetime cultural requirements. It's a matter in which both State and municipal authorities might be equally interested. Such a service could not succeed without leadership, and leadership is a matter of specialised training. The idea of our correspondent of establishing a good agricultural reference library in his home town is commended as one worthy of general adoption.

Food—An Essential Factor in Winning the Peace.

When the war is won one fundamental factor in making and maintaining peace will be food for a hungry world. To provide for the food needed will be a major problem, and that fact should ensure for the food producer the highest priority.

With recognition of that priority must go an equal recognition of the national status of the primary producer. Let us hope that that status, recognised as it is now, will never be reduced.

The foremost interest in every family in the world is food, then comes clothing and shelter, all provided by the primary producer. The hungry man with a hungry family isn't likely to be concerned with the problems of world federation, nor with any nebulous "new order." He will follow any leader so long as he is promised food. Recent events have proved that. The reoccupied countries are demanding food; the first thing they ask for is food, but food can't be got by the mere asking. Apart from the time element, there are the personnel and the material required. Even mechanised equipment and streamlined farming can't produce food overnight. Food will certainly not be produced by making a speech about the necessity of producing food. It's a case of applying the plan to the job and getting on with the job. The needs of the primary producer are known: he must have the labour and the equipment and those other things without which large-scale food production can't go on. A substantial increase in food production in all countries will guarantee peace more firmly and for longer than any other course which may be proposed.

Plate 47.
Wyaga Merinos, Goondiwindi, Queensland.

Plate 48.

Water Supply in the Brigalow Country.—Tank on Bybera, near Inglewood, South Queensland. When first tested, the flow from the nearby sub-artesian bore was nearly 1,000 gallons per hour. The flow has since increased considerably. Water couch grass is growing on the batter of the tank, and as the water rises in the tank the grass spreads over the surface for some distance from the bank, thus probably reducing evaporation appreciably.

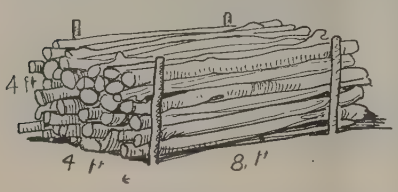
GADGETS AND WRINKLES

TIMBER MEASUREMENT.

TIMBER STACKED IN CUBES: 1 CORD = 128 CUBIC FEET.

Rule.—Measure in feet, and multiply length by height by depth; divide by 128 = cords.

Example.—A stack of wood measures 8 feet long by 4 feet high and 4 feet deep.



$$\frac{8 \times 4 \times 4}{128} = 1 \text{ cord.}$$

Suggestion when Letting Contract.—Stipulate that the timber is to be stacked in heaps, measuring 8 feet long by 4 feet deep and 4 feet high. When measuring for settlement, carry stick or wire 4 feet long, and raddle each heap after measuring.

Or, if length of stack is not stipulated, but height and depth of all heaps are 4 feet, add length of various stacks together, and proceed as in example above.

SAWN TIMBER.

1 running foot of sawn timber equals 1 foot length of any given size.

1 super. foot is 1 foot long by 1 foot wide by 1 inch thick.

Timber being always measured by super. feet (except in cases of some special small sizes), it is necessary to reduce running feet of each size as delivered to super. feet, as charged.

Rule.—Multiply length (aggregate) in feet by width of timber in inches, and by thickness of timber in inches; then divide by 12, gives super. feet.

Example I.—16 pieces 10 feet long 3 inches by 4 inches.

$$\frac{16 \times 10 \times 3 \times 4}{12} = 160 \text{ super feet.}$$

Example II.—10 pieces 3½ inches by 6 inches by 20 feet long.

$$3\tfrac{1}{2} \text{ inches} = \tfrac{7}{2}\ 10 \times 7 \times 6 \times 20 = 350 \text{ super feet.}$$

$$2 \times 12$$

To estimate the quantity of sawn timber a log would yield: Multiply three-quarters the length by the square of the mean girth.

Example I.—Log 20 feet long by 5 feet mean girth (say 4 feet girth at small end, and 6 feet at thick end, gives 5 feet mean).

¾ of length = 15 feet.
Multiply by square of mean girth (5 × 5) = 25

375 super. feet.

A super. foot is 1 foot long, 1 foot wide, 1 inch thick.

Multiplying by ¾ the length instead of the whole length allows for ordinary waste in squaring the log.

Example II.—Log 20 feet 8 inches long 5 feet 5 inches mean girth.

¾ of length = 15 feet 6 inches = 15½ feet.

Multiply by square of mean girth,—65 × 65 inches.

65 × 65 × 15½.

inches. feet. inches.
= 65487½ ÷ 144 = 454 : 111½
= About 454¾ super. feet.

Mother and Child.

Under this heading an article supplied by the Maternal and Child Welfare Service of the Department of Health and Home Affairs, dealing with the welfare and care of mother and child, is published each month.

THE EXPECTANT MOTHER.

WHEN one pauses to consider the life of the infant before birth, the first idea that comes to mind is the close connection which exists between the mother and the unborn child. Nothing can reach him except through herself—her food, her habits, her state of health, even the condition of her mind have some influence upon his development. He in turn has an influence upon every organ in his mother's body and this may be so profound that she may be said to tingle to her very finger-tips with the new life that is in her.

From the moment conception occurs, there is set in motion a series of changes which become more and more complicated and momentous as development proceeds. Were it possible to screen these changes which are taking place silently within the body of the mother as the unborn infant grows from a tiny droplet to a small body of recognisable shape and ever increasing complexity, until maturity is reached, the screening would be viewed with feelings of wonder and amazement.

The changes in the body of the mother and the unborn child do not always follow a smooth and regular course. It is wise therefore for an expectant mother to place herself under the care of a doctor who can supervise her health during this very important period of her life. In this way, she will be doing what she can to preserve her own health and that of her baby and to ensure an easy and safe confinement.

Most women are never healthier or happier than when they are pregnant, but however well an expectant mother may feel, she should not neglect to see her doctor early. One advantage of doing this is that she will learn what she may do safely and she will secure peace of mind from the knowledge that her own health and the health of her baby are being cared for by someone in whom she has confidence and who knows the danger signals.

For some women, pregnancy is a time of discomfort. Fortunately, many of the milder ailments from which an expectant mother may suffer can be easily corrected or altogether avoided.

As the baby is entirely dependent upon his mother for his nourishment during the nine months before birth, she requires to eat the foods which will meet his needs and at the same time keep her well. As was pointed out in the last month's article, a baby's teeth begin to form about seven months before he is born; it is vitally important therefore that he should be supplied with the minerals necessary for their formation, namely, lime and phosphorus. If the mother does not take food which contains a sufficient quantity of these, her teeth will be liable to decay and, if these minerals are in very short supply, the teeth of the infant may be poorly formed. Every expectant mother's diet should include milk, cheese, butter,

eggs, meat, whole grain cereals, vegetables (cooked and uncooked), and fruit. This diet will supply not only the minerals, but also the vitamins necessary. In addition, she must follow all the rules for healthy living.

For further information and advice on how to keep fit, expectant mothers are invited to write to the Sister in charge of the *Ante-natal Section* of the *Maternal and Child Welfare Service*, 184 *St. Paul's Terrace, Brisbane*, from whom also a copy of the booklet, "The Expectant Mother," can be obtained. These letters may be addressed *Baby Clinic, Brisbane*, and need not be stamped.

IN THE FARM KITCHEN.

Our Daily Bread.

THE following points* on the art of bread-making have an especial interest at the present time:—

Flour.—Of all cereals, wheat yields the best flour for bread. This is because it is the only grain which contains the constituent gluten in the proper proportion and of the desired quality essential for turning out light, spongy bread. Flour also contains a large proportion of starch. The following is a simple test of the presence of these constituents:—A cupful of white flour in a muslin bag, if saturated with water and pressed, leaves a yellowish, tough, elastic substance in the bag, somewhat the size of a walnut. This is the gluten, the starch having been expelled. This experiment gives a rough estimate of the proportion of gluten to starch in a standard flour.

White flours are classified differently in different countries. There is the millers' classification, the classification for commercial convenience in buying and selling, but the housewives' classification is from a very different standpoint, and should be as follows:—

1. Strong or old flour.
2. New flour.
3. Fine flour.
4. Weak or feeble-bodied flour.

The first is of a deep, creamy colour, the kind that tumbles in a fluffy light form out of a bag. If examined with a microscope, its gluten cell walls will be found to be very strong, having power to hold the gases formed by the action of yeast. Old flour is dry, and will absorb a large proportion of water.

The second type is whiter than the first one and because of its inherent dampness absorbs less water. It may be noticed that some flours retain their shape when pressed, an invariable sign that the flour is new.

The third, fine flour, is soft and elastic, not spongy and puffy, and producing a smaller loaf to the same proportion of flour. Its gluten is usually plentiful, its flavour in general being fine and "nutty."

Weak or feeble-bodied is deficient in gluten, and hence in the capacity to retain the gases produced by the action of the yeast, as well in the power of absorbing moisture.

Strong flours therefore are most suitable for bread, fine flours for Christmas cakes, short pastes and short bread.

Yeast.—Various moulds and bacteria are the cause of decomposition and putrefaction of foods. Spores of moulds may float about in the air. It should be remembered, however, that as well as harmful organisms, the air around furnishes useful bacteria. Wine, vinegar, and cheese are the result of these bacteria, properly employed.

Yeast also enters this category. It is a minute plant of the "fungi" family, so small that one million would cover only one cubic inch. Warmth and moisture speed its growth, its food being the sugar formed from starch. It thrives best at 78 deg. F. Its chief power is that of changing starch to sugar, and then converting the sugar into alcohol and carbonic acid gas. Provided the right food and conditions are given it, yeast propagates rapidly, at the rate of one million per hour.

* From an article in the *Journal of Agriculture, Western Australia*, and reprinted in the *Queensland Agricultural Journal for April*, 1931.

The gas generated by the action of the yeast is all important in bread making, for it is that which causes the sponge to rise, striving as it does to escape from its imprisonment in the gluten cells. It is possible to classify yeasts thus:—

(*a*) Liquid yeast.
(*b*) Distillers' yeast.
(*c*) German or compressed yeast.
(*d*) Dried yeast.
(*e*) A semi-dried form called putty yeast.

Liquid yeast is cultivated from a mixture of potatoes, sugar, water and hops.

Distillers' or brewers' yeast is a natural type, skimmed from fermented rye.

The dried variety is made from hops and potatoes, mixed with starch and pressed into cakes.

The last type is built up in layers of semi-dried yeast.

Hops act as an antiseptic, i.e., they help to destroy the power of certain bacteria and prevent thus the propagation of wild yeast. Consequently it is advisable to use yeast made from hops, as the use of poor potatoes and impure materials produces wild yeast which spoil bread. As well as this negative use, hops improve the flavour of the bread.

To ensure really successful bread, the making of yeast should be attended with every care and cleanliness. An old bottle (used before) can be used, but the corks and fittings should be perfectly clean, as the entry of foreign germs tends to spoil the value of the true yeast and start different cultures.

Preparation of Yeast.

Hop Yeast.—1 large potato, 1 pint water, 1 tablespoon sugar, 1 tablespoon flour, 1 teaspoon hops.

Method.

1. Boil potato, add hops while still boiling. Boil twenty minutes.
2. Strain, cool slightly, add flour and sugar.
3. Bottle and cork tightly.
4. The yeast should work in a few hours in a bottle previously used for yeast, 24 hours in a new bottle.
5. A fig or a raisin added will make it work more quickly.

Acid Yeast.—A medium-sized potato, 1½ tablespoons sugar, ½ teaspoon citric or tartaric acid, 1 cup warm water, 2 teaspoons flour.

Method.

1. Boil a mashed potato, add other ingredients and sufficient water to keep mixture at cupful.
2. Bottle and cork tightly.
3. Keep in a warm place twelve hours in an old yeast bottle and 24 hours (at least) in a new bottle.

White Bread.

Small quantity.—1½ lb. flour, ¾ pint tepid water, 2 tablespoons home-made or 1 level tablespoon brewers' yeast, 2 teaspoons sugar, 1 teaspoon salt.

Method.

1. Sift and warm 1 lb. flour, make a well in the centre.
2. Beat yeast and sugar to a cream.
3. Pour yeast and tepid water into flour and stir to a moist dough. Beat well.
4. Cover and stand in a warm place till the dough doubles its size. (Brewers' yeast takes about one hour and home-made several hours.)
5. Turn to a floured board and knead in the extra ½ lb. flour and salt until the dough is of even texture.
6. Shape into loaves, put into greased and floured tins.
7. Allow to rise in a warm place about half an hour.
8. Cook in a hot oven until the loaf is well risen and brown, then place in a cooler part until the bread is cooked through—thirty to forty minutes in all.
9. When cooked the bread should give a hollow sound when tapped on the bottom.

Wheaten Meal Bread.

1½ lb. whole meal or half wholemeal and half plain flour, 1 tablespoon yeast, 1 teaspoon salt, ¾ pint tepid water, 1 teaspoon sugar.

Method.

Proceed as for white bread, but more moisture, a hotter oven, and longer cooking are required.

The actual baking of bread is perhaps the most important part. With the utmost care in choosing flour, making yeast, and following the correct procedure for mixing, if the oven is not at the right temperature the bread may be spoilt. The scientific baking of bread is to fix the air cells as quickly as possible by means of the hot oven. A novice would do well to test the oven thus:—Place a tablespoon of flour on a saucer for five minutes in the oven. If the oven is—

(*a*) Hot—the flour becomes dark brown.
(*b*) Moderate—the flour becomes a golden brown.
(*c*) Cool—the flour becomes pale brown.

The yeast will go on working or growing in the flour if the oven is too cool, still splitting up the starch and more alcohol is formed, which cannot escape. The bread has then a "beery" taste. If, on the other hand, the oven is too hot and the loaf begins to brown in less than fifteen minutes, a crust is formed and the inside of the loaf remains damp and uncooked.

Abnormal Fermentations.—The normal fermentation in bread making is due to the energy of the yeast plant growing and multiplying in the dough, giving off carbon dioxide, and producing changes which result in making bread palatable and digestable. Other fermentations, however, sometimes occur.

Sticky or sour bread is due to lactic acid bacteria. These are associated with low-grade flour. The germs of these bacteria often lie dormant until essentials, such as warmth and moisture, necessary to their growth, are provided, and they then develop. Injurious germs also appear with yeast. This is sometimes overcome by the use of hops, which assists true yeast to overpower poor yeast. Dirty utensils and troughs harbour injurious bacteria. All crevices and cracks are teeming with unseen life, which reproduce enormously when given favourable conditions.

Musty or mouldy bread is usually noticed only after bread has been cut. This is due to damp flour in which fungi or mould has developed. Bags or other containers holding this flour should be thoroughly scalded and scoured before being used for a fresh supply.

The same procedure should be followed if bread is what is termed "ropy," or when tiny red marks appear. These, too, are the effects of wild yeasts, which have found their way into the dough.

Plate 49.

PREPARING GROUND FOR THE HOME VEGETABLE SUPPLY.

ASTRONOMICAL DATA FOR QUEENSLAND.

MARCH.

TIMES OF SUNRISE AND SUNSET.

At Brisbane.			MINUTES LATER THAN BRISBANE AT OTHER PLACES					
Date.	Rise.	Set.	Place.	Rise.	Set.	Place.	Rise.	Set.
	a.m.	p.m.						
1	5.41	6.20	Cairns	30	27	Longreach ..	36	34
6	5.44	6.15	Charleville ..	27	27	Quilpie	35	35
11	5.46	6.10	Cloncurry ..	51	48	Rockhampton ..	10	10
16	5.49	6.04	Cunnamulla ..	29	29	Roma	17	17
21	5.52	5.59	Dirranbandi ..	19	19	Townsville	25	23
26	5.54	5.53	Emerald	19	19	Winton	41	39
31	5.57	5.48	Hughenden ..	35	33	Warwick	4	4

TIMES OF MOONRISE AND MOONSET.

At Brisbane.		
Date.	Rise.	Set.
	p.m.	a.m.
1	7.50	7.15
2	8.21	8.07
3	8.53	8.58
4	9.26	9.49
5	10.01	10.42
6	10.40	11.36
		p.m.
7	11.24	12.30
8	..	1.27
	a.m.	
9	12.13	2.23
10	1.09	3.17
11	2.09	4.09
12	3.14	4.58
13	4.20	5.43
14	5.28	6.26
15	6.36	7.08
16	7.43	7.49
17	8.50	8.31
18	9.56	9.16
19	11.01	10.02
	p.m.	
20	12.04	11.52
21	1.02	11.45
22	1.57	..
		a.m.
23	2·47	12.40
24	3.31	1.36
25	4.11	2.31
26	4.47	3.25
27	5.20	4.18
28	5.51	5.10
29	6·22	6·02
30	6·54	6·53
31	7·27	7·44

MINUTES LATER THAN BRISBANE (SOUTHERN DISTRICTS).

Charleville 27; Cunnamulla 29; Dirranbandi 19;
Quilpie 35; Roma 17; Warwick 4.

MINUTES LATER THAN BRISBANE (CENTRAL DISTRICT).

Date.	Emerald.		Longreach.		Rockhampton.		Winton.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	19	20	34	37	10	11	39	42
6	26	13	43	28	18	3	50	32
11	27	12	43	26	18	1	51	29
16	18	21	34	38	9	12	38	43
21	11	28	26	43	1	19	29	52
26	14	24	30	40	5	16	34	47
31	23	16	39	31	14	7	45	36

MINUTES LATER THAN BRISBANE (NORTHERN DISTRICTS).

Date.	Cairns.		Cloncurry.		Hughenden.		Townsville.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	27	33	49	53	33	38	23	28
3	35	24	54	46	39	32	29	21
5	43	15	59	41	44	26	36	15
7	49	9	63	37	48	23	40	10
9	50	6	64	35	48	21	41	8
11	49	7	63	36	48	21	40	8
13	42	17	58	43	43	27	35	17
15	31	29	52	50	36	35	26	25
17	20	40	44	57	29	42	18	34
19	12	47	39	62	24	47	12	39
21	7	50	36	63	21	49	8	42
23	9	49	37	63	22	49	9	41
25	13	45	40	60	25	46	14	37
27	21	38	45	56	30	41	19	33
29	29	30	51	50	34	34	24	24
31	38	21	56	45	41	30	32	19

PHASES OF THE MOON.

Last Quarter March 7th, 2.30 p.m.; New Moon March 14th, 1.51 p.m.; First Quarter March 21st, 5.11 a.m.; Full Moon March 29th, 3.44 a.m.

DISCUSSION.

On March 21st the Sun will rise and set true east and west respectively; this being the day of the equinox.

On March 29th the Moon will rise and set almost true east and true west respectively.

Venus.—At the beginning of the month in the constellation of Pisces, Venus sets a couple of hours after sunset. On March 10th it reaches its greatest brilliancy. By the end of the month it will be in the constellation of Aries and will then set within one hour of sunset.

Mars.—Throughout this month Mars rises after 3 a.m. At the beginning of March in the constellation of Capricornus it rises about 20 degrees south of true east. At the end of the month in the constellation of Aquarius it rises about 12 degrees south of true east.

Jupiter.—Jupiter on the 13th of this month is in opposition to the Sun, *i.e.* the Sun, Earth, and Jupiter are in line, the Earth being between the Sun and Planet. This month then Jupiter rises round about sunset and sets near sunrise. About the middle of the month it passes from the constellation of Virgo to the constellation of Leo.

Saturn.—Saturn in the constellation of Gemini rises during the afternoon and sets about midnight, 24 degrees north of true west.

OUR SOLAR SYSTEM.

So great is the distance between the Earth and the stars that the revolution of the Earth round the Sun has practically no effect on the relative positions of the stars and also, at this tremendous distance, any movement which the stars themselves may have is almost unnoticed. The constellations have remained as such over a very long period and the present grouping and names have been handed down to us from thousands of years back. In dealing with the movements of the planets, then, we are concerned with the effect as seen from the Earth against the apparently fixed starry background of the sky. To illustrate the result of these movements it is beyond our means to provide models true to scale, maintaining correct relation of size and distance, for if the Sun be represented by a ball 2 feet in diameter, Mercury would be represented by a grain of mustard seed revolving in a circle of 164 feet diameter; Venus by a pea revolving in a circle 184 feet wide; The Earth also by a pea revolving in a circle 430 feet wide and having a mustard seed revolving round the pea at a distance of 6 inches to represent the moon. Mars would be represented by a large pin head revolving in a circle of 654 feet diameter; Jupiter by a medium sized orange revolving in a circle nearly ½ mile wide; Saturn by a small orange revolving in a circle ¾ mile wide; Uranus a full sized cherry revolving in a circle 1½ mile wide, and Neptune by a large sized plum revolving in a circle about 2½ miles wide. On this scale, the nearest star would be represented by an object 11,000 miles away.

Supplied by the Astronomical Society of Queensland.

QUEENSLAND WEATHER IN JANUARY.

Throughout Queensland during January only one district (North Coast Barron) showed over-average rainfall distribution of 1,821 points (37 per cent. above normal). The next best, the Eastern Downs, with a district average of 342 points was 9 per cent. below normal, and the Peninsula North, 1,138 points, was 18 per cent. below. All other districts registered under-average figures ranging from 21 per cent. in the Western Downs to 74 per cent. in the Upper Carpentaria and Lower West. During December, 1944, considerable sections of the Central and Tropical Interior received over-average storm rains starting a favourable pasture growth, while most of the Downs and South Coast had a useful to over-average distribution to supplement the improved conditions commencing with late October rain. Although many sections of the dairying and agricultural areas of the south-east quarter are in fair to good order, quickly drying pastures required a normal seasonal general soaking rain. Over inland pastoral areas growth started in the Tropical Interior by December storms needed at least another good general distribution to maintain carrying conditions over the winter months. Central Highlands and adjacent coastal areas also experienced a sustained rainfall deficiency. In these considerable regions of the State, however, normal monsoonal rains of February and March should meet requirements in most districts In the drought areas of the Southern Interior, many with a rainfall of only 5 to 8 inches during 1944, the need was urgent, not only partial relief but for a succession of soaking falls.

Temperatures.—At Longreach recorded temperatures over 100 degrees on 24 days—highest 106 degrees (10th); Boulia—18 days over 100 degrees; Thargomindah—17 (111 degrees 9th, highest for month).

The rain position is summarised below:—

Division.	Normal Mean.	Mean January 1945.	Departure from Normal.
	Points.	Points.	Per cent.
Peninsula North	1,389	1,138	18 below
Peninsula South	935	605	35 ,,
Lower Carpentaria	725	351	52 ,,
Upper Carpentaria	628	164	74 ,,
North Coast, Barron	1,328	1,821	37 above
North Coast, Herbert	1,411	1,101	22 below
Central Coast, East	893	293	67 ,,
Central Coast, West	537	279	48 ,,
Central Highlands	400	311	22 ,,
Central Lowlands	321	115	64 ,,
Upper Western	316	175	45 ,,
Lower Western	170	45	74 ,,
South Coast, Port Curtis	658	463	30 ,,
South Coast, Moreton	671	429	36 ,,
Darling Downs East	375	342	9 ,,
Darling Downs West	298	235	21 ,,
Maranoa	302	195	35 ,,
Warrego	214	87	59 ,,
Far South-West	191	63	67 ,,

Commonwealth Meteorological Bureau, Brisbane.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

DECEMBER RAINFALL.

(Compiled from Telegraphic Reports).

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Dec.	No. of years' records.	Dec., 1944.	Dec., 1943.		Dec.	No. of years' records.	Dec., 1944.	Dec., 1943.
North Coast.	In.		In.	In.	*South Coast—contd.*	In.		In.	In.
Atherton	7·02	42	11·24	3·50	Gatton College	3·89	44	2·95	9·34
Cairns	8·53	61	4·14	2·43	Gayndah	4·21	72	4·04	5·64
Cardwell	7·95	71	4·60	2·22	Gympie	5·40	73	5·67	6·88
Cooktown	6·53	67	8·90	4·96	Kilkivan	4·61	62	4·96	7·51
Herberton	5·64	57	5·67	2·41	Maryborough	5·05	72	5·69	8·83
Ingham	6·77	51	2·33	1·78	Nambour	6·65	47	4·96	6·15
Innisfail	11·16	62	8·78	6·60	Nanango	3·86	61	5·04	9·52
Mossman	8·00	19	10·14	6·51	Rockhampton	4·67	72	4·22	4·35
Townsville	5·33	72	2·88	0·75	Woodford	5·34	55	3·03	10·84
Central Coast.					*Central Highlands.*				
Ayr	4·20	56	5·50	1·41	Clermont	3·77	72	2·94	3·03
Bowen	4·49	72	3·47	5·65	Springsure	3·28	74	5·98	3·56
Charters Towers	3·26	61	8·32	3·58					
Mackay	6·86	72	2·56	3·97	*Darling Downs.*				
Proserpine	7·72	40	3·93	7·00	Dalby	3·49	73	1·61	8·41
St. Lawrence	4·67	72	3·28	6·32	Emu Vale	3·52	47	2·71	6·65
					Jimbour	3·44	64	2·62	6·90
South Coast.					Miles	3·17	58	1·84	5·26
Biggenden	4·85	44	5·62	8·84	Stanthorpe	3·56	70	3·16	4·02
Bundaberg	5·10	60	3·84	6·95	Toowoomba	4·53	71	2·11	9·69
Brisbane Bureau	4·95	91	3·47	15·23	Warwick	3·50	78	2·74	6·20
Caboolture	5·48	67	4·02	20·63					
Childers	5·80	48	4·57	9·03	*Maranoa.*				
Crohamhurst	7·19	50	2·66	9·19	Roma	2·59	69	1·26	1·91
Esk	4·76	56	1·83	13·38	St. George	2·09	62	0·30	1·96

CLIMATOLOGICAL TABLE FOR DECEMBER.

Compiled from Telegraphic Reports.

Divisions and Stations.	Atmospheric Pressure at 9 a.m. Mean	Shade Temperature.		Extremes of Shade Temperature.				Rainfall.	
		Mean Max.	Mean Min.	Max.	Date.	Min.	Date.	Total.	Wet Days.
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Points.	
Cairns	..	88	74	94	15, 27	66	8	414	15
Herberton	..	85	63	94	8, 9	52	7	567	12
Townsville	..	85	75	92	8	67	7	288	7
Brisbane	29·84	87	69	101·8	11	59·8	3	347	9
Darling Downs.									
Dalby	..	92	68	103	11	54	3	161	9
Stanthorpe	..	85	57	95	31	44	4	316	8
Toowoomba	..	84	63	94	7	52	4	211	10
Mid-Interior.									
Georgetown	29·78	97	74	106	7	69	25	1,202	12
Longreach	29·81	99	74	110	7	65	4	322	6
Mitchell	29·79	95	65	106	29	54	23, 24, 25	165	3
Western.									
Burketown	..	96	77	101	8, 9, 10, 24, 25	72	24	138	7
Boulia	29·73	98	74	108	7, 29	64	22, 24	335	3
Thargomindah	29·77	97	71	110	6	61	2, 13	115	5

A. S. RICHARDS, Divisional Meteorologist.

Commonwealth of Australia,
Meteorological Bureau, Brisbane.

The Queensland Agricultural Journal

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